London South Bank University

EST 1892

THE TRANSFORMATIVE NATURE OF NETWORKS WITHIN CONTEMPORARY ART PRACTICE

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A thesis submitted in partial fulfilment of the
requirements of London South Bank University
for the degree of Doctor of Philosophy

May 2018

Abstract

Since the introduction of the World Wide Web in 1991, it has had a significant impact on contemporary art. As a consequence, however, networks are almost exclusively considered as technologically determined, art produced is digital, refers to the internet and is more often than not specifically web-based. This research redefines the role of networks in contemporary art. It proposes that networks are not a specific technology that provides a means for art practice to occur but are a concept that transforms practice and enables a networked art.

Networked art is a continuation of twentieth century developments in art including cybernetic art, systems aesthetics, new media art and relational aesthetics. The research discusses these and considers how practice became systemised through strategies such as the dematerialization of art as object (Lippard, 1997) and the renouncement of objecthood (Fried, 1998). Equally important is the emergence of cybernetics and systems theory that explained concepts such as process and behaviour frequently employed in art practice. By defining a network as a type of system, networked art is foremost concerned with connections or links and considers the resulting behaviours that occur. Networked art is therefore not centred on networks as form. It can adapt as technologies evolve over time and as such is considered post specific technologies and the disciplines connected with them.

Emerging out of my ongoing art practice this practice-led research makes an original contribution to knowledge in the field of contemporary art in three ways. Firstly, it demonstrates how networks in contemporary art do not have a basis in a specific technology since they have been employed before current technologies. Secondly, the research explains networked art through the development of a framework and practice as research that informs each other. Thirdly, the research discusses emergent processes, themes and content and clarifies how networked art positions itself within current contemporary art discourse as a post-disciplinary practice.

Acknowledgements

I would like to acknowledge and thank a number of people who supported me throughout my doctoral study. First and foremost is my partner Frédérique Santune who engaged in many long conversations about networked art with me and deepened my understanding of aspects of Deleuze and Guattari. Halfway through my doctoral journey, she decided research by proxy was not satisfying enough and was accepted as a doctoral researcher to pursue her research interests. I look forward to reading her thesis and to a relaxing holiday together sometime in the future.

Enormous thanks go to my first supervisor Dr Maria Chatzichristodoulou who saw me through the entirety of my research, transitioned me from the University of Hull to London South Bank University, provided invaluable support and was always available. Thank you for constantly being honest, vocal and direct, the most important qualities of a doctoral supervisor. Many thanks also to Dr Annet Dekker, my second supervisor, who supported me through the final two years of my research and had the difficult and unenviable task of catching up and understanding my research.

Thank you, Ebon Fisher, Gaia Tedone, Francis Halsall and Josephine Bosma for your time and allowing me to interview each of you. Your knowledge all contributed uniquely to my proposed framework. Ebon Fisher your lengthy and on-going correspondence over the final year of my research provided a unique perspective to questioning art practice and pushed me to think about networks as a non-technological phenomenon in new ways. Gaia Tedone, many thanks for providing an opportunity for embodying aspects of my research as practice and for the many conversations we had about our research and its overlap.

Lastly, I would also like to thank all the academic staff at London South Bank University and in particular those from the Centre for the Study of the Networked Image who provided an inclusive and academically inspiring environment.

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Online material

An interactive animated model of the framework of networked art is available online as accompanying material. The model is available at this URL:

- http://www.asquare.org/framework/

Computer system requirements:

The model is best viewed with *Chrome version 49.0.2623.112* or higher. It will also work with *Firefox version 48.0.2* or higher, however, if the browser's antialiasing setting is turned off rendering will be pixelated and image quality poor.

Chapter 1: Introduction

> "As a rule historians try to develop analytical tools covering the broadest array of art styles, but as innovation further fragments the art impulse, and new and contradictory styles of art arise, historians are forced to adopt a variety of approaches. Not too many critics or scholars seem to be worried by this situation although they should be. It indicates that all their efforts are directed toward explaining the physical evidences of the art impulse, rather than the conceptual conditions which make art objects possible under vastly different circumstances" (Burnham, 1973, pp. 2–3).

1.1 Research background and defining the problem

The origin of this doctoral practice-led research is my ongoing artistic practice centred on networks.[1] The initial catalyst and context to my practice is contemporary art that employs new and emerging electronic and digital technologies; that is art that has been influenced by these technologies since, as it is argued in this research, the inception of cybernetics and systems theory.[2] As such, this places the research's starting point as located within the context of contemporary art practice and its intersection with technology.

This section will provide a brief outline of how the research was initiated and an introduction to my practice as part of the background to the research. Following this will be a discussion of the research's problem. The research is the culmination of what was initially a loosely defined inquiry into the use of networks in artistic practice manifested as the *Network Research* (2006–14) weblog. The weblog, which consisted of documenting relevant artworks, artist's practice, exhibitions, publications and conferences, allowed me to generate and refine ideas through writing, archive them for future reference and served as a springboard to articulate ideas that I presented through practice and writing in exhibitions, publications and conferences.

1 My practice is documented at http://www.asquare.org/.

2 These coincide with numerous developments in the early twentieth century, such as the development of communication theory, which all coalesce in various ways including yielding the origins of the Information Age.

Emerging out of a combination of observations documented in *Network Research*, this research completes what was started in the weblog as what is intended to be a well-structured body of research supported by a critical understanding of the field.

However, the research is not the conclusion of all of my research on networks within art contexts. Instead, its purpose is to form a significant step for me towards understanding the "conceptual conditions" (Burnham, 1973, p. 3) of an artistic practice. It will enable me to position my practice within a broader context of concurrent emerging practice and thereby allow an understanding of such a practice to develop beyond the confines of specific technologies and forms. As a consequence, the research will additionally allow the emerging practice to be framed and communicated cohesively within contemporary art to and subsequently by those involved in its discussion, theorisation and criticism.

Since the research can be understood to be practice driven it is important to clarify what my typical practice consists of as part of the research's background. As stated above, my artistic practice is centred on networks. Networks, in the widest sense of the term, are explored as spaces that can be established between artist, artwork and audience as a means, site and context for artistic initiation, creation and discourse. Ranging from the technological to the social, networks have for example been employed in artworks created prior to this research to juxtapose artist and audience in performative scenarios or to combine various media from different sources into a cohesive whole. Artwork developed since 2008 employing Second Life, an online 3D simulated world that allows users to socialise, provides an example of the former. Performances explored the representation of identity as an avatar within networks and how the avatar relates to its user. *Netscapes* (2011), an artwork created just prior to commencing this research, provides an example of the latter that composed views of imaginary landscapes assembled from combinations of different internet webcam feeds.

While my practice is not conceptually tied to a particular type of network, for example, it is not a web-based practice, it has up until the commencement of this research been closely associated with technological networks such as the internet. It was intended that through development of the research's thesis my practice would

gain a broader understanding of networks, in particular of non-technological networks, and how they can contribute to or be employed in practice. Practice created as part of the research included nine artworks (Appendix A) that were developed in parallel with theory. How this occurred and the practice's purpose with relation to theory is explained fully later in this chapter (see chapter 1.3). However, in relation to gaining a broader understanding of networks, each artwork explored a different type of network, including social networks, product or commodity networks, knowledge networks and financial networks, and considered how they could be employed to create combinations of actions, events and/or artefacts as art. All nine artworks were exhibited to the public in June 2017 at the Borough Road Gallery in London. Presented under the title *Transformations*, the exhibition detailed a range of networks and their transformation of the processes, themes and content employed within the artworks (Appendix A), thereby demonstrating the principle thesis of this research. Six artworks will be discussed in depth in chapters 4 and 5 as examples of the thesis in action.

With an outline of the research's background now complete the following discussion will define the problem that this research addresses. Over time there have been various names assigned to technological art practice. These include: electronic art, art created through a variety of electronic means (Popper, 1993); computer art, art that is conceived with computers (Brown, *et al.*, 2008); digital art, specifically visual art that is created with and arguably for viewing on computers (Paul, 2008); virtual art, art that is virtualised or can be said to create an immersive space (Grau, 2003; Popper, 2007); and since the 1990s what has become an “umbrella term” (Paul, 2008, p. 7) for all of these and more, new media art (Manovich, 2001; Hansen, 2004; Kimbell, 2004). While terminology has always been “extremely fluid” (Paul, 2008, p. 7) between these practices, the names signal distinctions in their definitions that reflect ways of thinking about technologies and/or how they change over time. Viewed all together these names for technological artistic practice can be understood to demonstrate an overall progression from the consideration of electronic and digital technologies as a tool to medium and finally environment.

Each of the names listed above for technological art practice has, however, a form of built-in obsolescence, that is their names refer to or imply *specific technologies* that

will be revised or replaced over time as technology always is. The names reflect technological developments in society and shift from one to the next as frequently as these developments occur. While it can be argued that this demonstrates that contemporary art is relevant to and actively engaging with society it can equally be argued that timeframes dictated by technological change are not necessarily compatible with art. From the 20th century onwards there is a demonstrable increase in the rate of technological change alongside an increase in the number of art movements and developments with a shorter life span, each of which can be considered as part of an accelerating society.

New media art to some extent resolves the issue of built-in obsolescence. It categorises media that is new, that exists as a consequence of new electronic and digital technologies and not media of a specific type or technology as prior technological art practices did. In a sense, new media art is to contemporary art as postmodernism is to modern art. It is not only technologically of its time, that is contemporary or modern, but innovative or perhaps even ahead of its time. New media art provides a means to explore processes, themes and subject matter in new ways, through new technologies. However, new technologies are rapidly becoming everyday and already being revised or replaced by newer technologies. Through application, style and so forth they are starting to become technologies that are specifically identifiable with new media art and this is once again creating obsolescence for new media art because it is largely defined by technology.

To state, however, that technology has been the only factor in a technological art practice such as new media art is an oversimplification of its history. A glance at any reader on new media demonstrates that fields as diverse as performance, literature, philosophy, media studies and cultural theory (Lister, *et al.*, 2003; Wardrip-Fruin and Montfort, 2003) have each contributed to it. While cases for cinema (Manovich, 2001), kinetic art (Popper, 1993) and conceptual art (Shanken, 2002) amongst others have also been made. The technologies of new media art are perhaps becoming specific to it yet many of the processes, themes or subject matter that it employs exist in fields, including other areas of contemporary art, which are either older or exist in parallel with new media art.

New media art, therefore, resides within a larger context and engages with wider and longer running discourses. It relies on modularity, non-linearity and linking to select and combine processes, themes or subject matter from other fields and as a consequence, it can be considered as potentially the postmodern appropriation form par excellence. Viewed from the perspective of contemporary art, processes, themes and subject matter have in a sense been imported into new media art. While new media art can, as a result, be understood to contribute to the development of contemporary art, it will, however, ultimately restrict further development of its processes, themes and subject matter as a consequence of obsolescence defined by technology.

It is art's relationship with technology that is the problem at the core of this doctoral research. Both art and technology are considered human practices. This does not mean that art and technology are only human practices but simply that the focus of this research lies in art as a human practice and its relationship with technology. Technology is therefore what is termed techne or technical knowledge produced by humans. For example, the domain of digital technologies as opposed to technology as artefact or product such as a computer as a digital technology (Tabachnick, 2004), while art is creative knowledge produced by humans. While distinct, art and technology should not be considered as separate, they frequently inform each other. In fact, art and technology have always been intertwined with knowledge permeating from each one to the other. As such, all art can strictly speaking be considered technological art. However, this is not in itself a useful or necessarily relevant definition with regards to this research. Instead, technological art is art that employs technology to such an extent that it becomes integral to its processes, themes or content and in effect defines it. As stated at the outset of this chapter the technological art referred to in this research is specifically art employing electronic and digital technologies such as new media art.

To attempt to separate technological art practice from the technologies it is identified with and allow its further development is unrealistic given the role technologies perform within practice. It would nullify what technological art has achieved and to some extent be revisionist of art history, that is remove it from existing understandings of its relation to technology. While new knowledge may provide a

new understanding of technological art in this way, for example understanding it in hindsight with relation to wider social, economic or historic contexts, it is equally arguable that technological art may lose its specificity to the context of its time. To somehow move beyond technology in contemporary art is unproductive or at the very least premature because while, for example, the technologies associated with new media art may be in the process of being revised or replaced, technology as a whole has not ceased. In addition, with numerous post-technological art practices currently emerging including post-digital and post-internet practices, all of which can be considered as residing within a post-media era (Guattari, 1985), removing technology from contemporary art or moving contemporary art beyond technology is unlikely to be a productive endeavour. It would be either retrospective or replicating what is already occurring.

This research focuses on three questions in addressing the problem of art's relationship with technology. These are:

1. How can a contemporary art practice continue to engage with technology and yet not be defined by technology?

2. What might such a practice consist of and how might it operate?

3. How would the art practice be transformed as a result?

The research proposes a practice that is not separated from or beyond technology but instead redefines the relationship between art and technology. In doing so it will suggest a way for technological art, or any consideration of technology within contemporary art, to continue to develop. The research proposes a shift from the *specific technologies and wider processes, themes or content* that occur in technological art to a practice that instead employs *specific processes, themes or content and the option of a variety of technologies*. The proposed practice is not technologically determined, or more precisely *technologically specific*, thereby eliminating or greatly reducing the consequences of technological obsolescence. In addition, it can be considered an alternative type of post-technological or post-media art practice. It does not establish itself as oppositional or successive to technological art by taking a reactionary approach as post-technological and post-media art often tend to imply. Instead, the practice is at the outset of the research understood to

traverse numerous disciplines, including technological disciplines, by providing a perspective of practice that is conceptually-based and can, therefore, be considered transdisciplinary. However, ultimately transcending or moving beyond the confines of disciplines is required for the practice. As such, an improvement of the terminology or understanding of transdisciplinarity will be investigated with a view to transforming how disciplinarity is considered within the practice.

The proposed practice addresses networks in contemporary art as one means of demonstrating how the relationship between art and technology can be redefined. It will challenge how networks have been considered and employed as a *specific technology* in contemporary art rather than the conceptual basis of *specific processes, themes or content*. This challenge is the result of networks in contemporary society being inaccurately considered as largely technological networks, including electronic and digital networks but in particular the internet. Consequently, networks have become almost inseparable from what are simply current *specific technologies*. An abundance of literature about technological networks, often distributed easily and rapidly through technological networks, reinforces this. Castells, for example, has argued that networks have impacted many aspects of society including economics, politics and culture. It is evident, however, that the networks he discusses, what he terms as the space of flows (2000), are predominately informational, that is they have a basis in digital technologies because they are created in the Information Age. According to Castells, this establishes that in effect networks in society are reliant on technology because networks seem to be optimised to favour technology as a result of their basis in information.

The same can be said to be true within new media art. New media art is reliant on technology as a tool, medium and environment so ultimately it sees and interprets from a technological position. Networks employed in new media art are therefore also interpreted as technological. Net art,[3] for example, engages with networks interpreted as a new media or technology. Its origins typically refer to “the Net” (Shulgin, 1997) as a liberating form and space. However, as a result of its coincidence with the emergence of the internet “the Net” (*ibid*) was immediately

3 Net art includes net.art, a name variation, however, does not include internet art, a technology-specific technological art, or browser art, a platform-specific technological art.

interpreted as the internet, the current *specific technology*, and not networks in general. The majority of discourse in contemporary art reinforces this interpretation (Baumgärtel, 2001; Corby, 2006; Greene, 2004; Paul, 2008; Stallabrass, 2003; Tribe and Jana, 2006; Weibel and Druckrey, 2001) instigating a technological art that can be understood as a type of new media art. In new media art's interpretation of networks contemporary art's engagement with networks prior to the internet, including for example cybernetic art and systems arts, are either largely omitted or don't inform the understanding of networks. Only rare instances acknowledge these and other art historical engagements with networks (Saper, 2001) as a crucial part of understanding networks in contemporary art. Net art, therefore, tied to the internet as a *specific technology*, has the same problem of technological obsolescence as all other types of technological art.

While contemporary art discourse on networks is largely technological, the experience of my practice as well as my observation of the practice of artists is that artist's engagement with networks is frequently not solely technological and that this trend is increasing. The rising frequency of this is without a doubt an indication of the emergence of post-technological practices. However, there have throughout the 20th century been artists who have engaged with networks through, outside and beyond specific technologies. Consequently, networks are presented in this research as *more than specific technologies*. While networks have been significantly influenced by current specific technologies, networks existed before them and will no doubt exist after them. By contextualising my practice and observed practice within a history of relevant contemporary art, developing and applying a framework to these practices, this research will demonstrate what such a practice can consist of and how it can develop independently of specific technologies. The proposed practice is termed networked art.

Contemporary art's consideration of networks as largely technological and of practice as reliant on specific technologies allows no possibility for a network centred practice to develop if technologies are revised or become obsolete. As such, there appears to me to be an impending dilemma in contemporary art that can and should be resolved. How can a network centred practice be established that does not simply employ networks as a technological substrate or enabler but equally does not

reductively consider networks as a form or aesthetic? Technology interpreted as form or aesthetic frequently occurs in technological art. In the proposed practice, where obsolescence and dependency need to be eliminated, interpreting networks as form or aesthetic would shift how practice is dependent on specific technologies, redefining practice through a temporary fix as yet another type of new or post art.

Networked art will be presented as having a basis in contemporary art that, similar to networks, existed before or outside the influence of electronic and digital technologies such as the internet and therefore originated independently of these specific technologies. Networked art will be proposed as distinct from technological practice that is dependent on electronic and digital technologies yet which can engage with all new technologies and has the potential to continue to do so as future technologies emerge. The practice of networked art will be what is considered as a networked perspective of practice, that is a practice that identifies, discusses and establishes connections or links between nodes. As such, networks will be understood as informing processes, themes and content.

1.2 Aims and objectives

There are three aims of this research. These will be discussed in this section along with their objectives. Firstly, the research will demonstrate that networks in contemporary art do not have a basis in a specific technology. Secondly and consequently, research will re-evaluate the categorisation of contemporary art employing networks as solely new media and/or net art and instead propose a practice that employs networks differently. Finally, based on the experience of my practice and the observation of the practice of other artists research will propose a framework that demonstrates how networked art can be achieved.

The aims will be accomplished through the completion of a number of objectives in both practice and writing. Within the practice, a series of artworks will be created. The initial conceptualisation of each artwork will assist in establishing the proposed networked art practice and demonstrate different ways processes, themes and content can employ networks. In addition, the practice will take opportunities relevant to the development of each artwork's specific process, theme and content to highlight how a wide variety of media can be employed. By doing so, it will provide a means towards demonstrating networked art as technologically non-specific and formulate its understanding of transdisciplinarity.

In parallel to the development of practice, writing will outline a history of networks in two parts. This history will investigate and discuss what is termed a pre-history of networks prior to the twentieth century and how networks are subsequently evolved in specific ways in the twentieth century. The intention is to establish the definition of networks as technologically non-specific and to provide context as to how networks were adopted within contemporary art practice. A selection of art practices that engage with networks through processes, themes and content will follow as a history of the proposed networked art practice.

Informed by the history of networks and their adoption within contemporary art practice discussed in writing and the ongoing demonstration of applying networks within practice, the research will construct a framework for networked art. The

framework is intended to be employed within and applied to the practice of artists, that is it can both serve as a reference for artists structuring and executing a networked art practice as well as for the discussion, theorisation and criticism of networked art by non-practitioners.

Finally, my practice and examples of relevant practice by contemporary practitioners will form the basis of a demonstration of the application of the framework. Examples of practice will, similar to the practice I produce, be selected on the basis of highlighting how a wide variety of processes, themes and content can be employed in networked art. Examples will consequently demonstrate how networked art is transdisciplinary, is therefore technologically non-specific and able to develop in ways where technology is not the principal factor.

1.3 Methodology

This research employs a number of research methods in its realisation. These include historical research, field research, case studies, practice as research (PaR) and interviews. The role of each method will be explained in this section followed by a discussion of aspects of the research methodology that traverse methods and potential issues within methodology. Research methods that entail document analysis such as the secondary research of qualitative data will form a significant portion of historical research. These will be concentrated in the early stages of the research as part of the literature review and in writing will form the basis of the first two chapters establishing the context of the research. Techniques employed to gather data will include literature searches, reviews of relevant academic publications, journal articles, conference proceedings, exhibition catalogues and artist's publications. These will enable the research to understand the origins of the networked art practice it is developing and help to locate it within a larger field of contemporary art practice.

Field research will consist of primary research gathered from two sources. The first of these are artist's exhibitions, which will be employed to view artworks firsthand that are discussed in this research. Information gathered by directly viewing artworks, the collection of artist statements, curator statements and exhibition publications will supplement historical research informing ongoing practice and the discussion of artworks. In addition, where permitted, high-resolution photographs will be taken of artworks for use as figures. The second source of primary research is conferences. The transdisciplinary nature of the proposed networked art means there are potentially a wide variety of relevant conferences that could have an impact on all stages of the research. However, only conferences that have a direct relation to the aims of the research and situate themselves within contemporary art will be attended. Since overall the research follows an hourglass structure that moves from a breadth of disciplines to the specifics of the networked art practice and finally broadens out to demonstrate its application, the intention is that this type of field research will address specific issues as they arise within the mid to late stages of the research.

Case studies of artist's artworks will be employed in this research before, during and after the development of the framework. These will support the development of my practice by enabling it to situate itself in relation to the artwork of other artists, in particular, their processes, themes and subject matter. Case studies discussed before the development of the framework will serve as examples of key art practices and developments that inform the framework. For example, a selection of new media artworks will be discussed to demonstrate how new media art relates to and develops out of older art practice and its relation to networks as well as specifically thinking about the role of technological networks and their related issues in contemporary art practice. Case studies discussed during and after the development of the framework will be employed as examples that demonstrate the proposed networked art and assist in validating its identified phenomenon. While most case studies employed in the research will no doubt demonstrate a diversity of practice as a result of their influences and interdisciplinary practice, it is the diversity of practice itself that will be highlighted in the case studies discussed after the development of the framework as evidence of the transdisciplinary nature of networked art.

Practice as research will be a key method employed in this research. My working method as an artist does not define a separation between theory and practice. Instead, a blending of theory and practice occurs as each can often be employed within what may conventionally be considered the delivery format of the other. For example, the communication of theory can occur through the creation of artworks as practice and practice can occur through writing as theory. This blending is in no small part contributed to by the importance of code, a form of language, within electronic and digital technologies, and its close relationship to imagery rendered in graphical interfaces. This research, therefore, will equally employ my networked art practice as practice as research and a thesis as a written document as part of the process of conceiving, structuring and communicating the thesis. Practice as research is a relatively new method of academic inquiry that involves the formulation of theory in creative ways that are typically outside of the format of the conventional thesis as a written document. It may, for example, employ any type of media, including text, and any method of expression such as the creation of artefacts or performance. The combination of theory and practice through writing and practice as research is important to the development of the thesis. It demonstrates that the

proposed framework emerges out of an understanding of practice, is theoretically supported and designed to be applied to practice.

My art practice as practice as research will serve two purposes. It will action initial ideas in progress thereby contributing to the development of the framework as well as test the framework's theories and their application. The practice, therefore, both informs and is informed by theory and can be understood to assume two modes of operation, initiating and responding to the research (Candy, 2006, p. 1). As a result, practice performs a role that could not be addressed by another mode of inquiry. However, the two modes of operation will not occur linearly or simply once. They will occur along with other research methods discussed above across a number of cooperative cycles following O'Leary's model of cycles of research (2004, p. 141). O'Leary's model describes a series of observe, reflect, plan and act steps to be repeatedly cycled or iterated through in the course of research. My practice, an outcome of observation, reflection and planning, will be the act step in the first cycle. Thereafter, practice will inform subsequent observation to act steps, each growing more complex as the research progresses by factoring in other artists' practice as part of observation and writing as part of acting.

My practice will also be considered as a case study of networked art, the only case study that is operational in full awareness of the framework. It will employ networks in a number of ways, including conceptually, socially and technically by being combinations of platform, site, form, medium and context. By doing so, it will describe a variety of transdisciplinary strategies employed in networked art, establish how the framework functions in the field and is transferable to other artist's practices ultimately demonstrating how networks transform the artworks produced and the practice of the artist.

The framework developed will form a key part of the method of enquiry in this research. By progressively developing and outlining the framework over a significant portion of the research it will explain the type of practice that is proposed, how it is structured and operates thereby addressing the first two questions of the research (see chapter 1.1). The framework's construction will occur through both practice and writing. Ongoing practice will inform the development, description and discussion of

the framework in writing. In turn, the framework's formalisation in writing will support practice through theory, opening up and encouraging opportunities for further practice. It is crucial that artworks are not pre-planned from the outset of the research to allow both practice and written components to develop organically in parallel and inform each other productively.

It is intended that practice will in a manner also be integrated into writing. The integration of practice will occur through the use of diagrams and form a key part of the process of constructing the framework. As an artist, I consider diagrams a form of practice, firstly as a result of their visual nature and the importance of visuals within a range of contemporary art practices, including my own, but also secondly and more importantly as a consequence of their relationship to networks. The relationship between diagrams and networks will be explored in detail as the research progresses, however, from the outset diagrams must be understood to not only illustrate and thereby communicate the framework but also be crucial to its conception. Diagrams will be employed throughout the framework's development progressing from rough drawings that work through the framework's concepts to the final digital renderings in this written thesis and the online interactive animated model that is provided as accompanying material[4] to support the framework's explanation. The framework's terminology will build on concepts derived from cybernetics, systems studies and a selection of subsequent art developments that have employed them thereby demonstrating networked arts relation to contemporary art. As a consequence of the interweaving of practice and writing, that is written and diagrammatic forms, to articulate the framework each should be considered as inseparable throughout this research and as a reflection of my working method as an artist.

In addition to the framework intended to be employed within the practice of artists, it is also intended to allow networked art to be framed and communicated cohesively within contemporary art to and subsequently by non-practitioners of networked art who are involved in its discussion, theorisation and criticism. As such, interviews will be employed in the final stages of the research that target key individuals in various

4 The interactive animated model is available at this URL: http://www.asquare.org/framework/

disciplines within the contemporary art world including a curator, academic and theorist. Sourcing data from these disciplines can once again be understood to be part of the transdisciplinary method of research discussed above in this section. However, it is in this instance not a reflection of networked art as transdisciplinary but instead, a means to evaluate the framework from a number of perspectives. The interviews will focus on the effectiveness of the framework as a means to communicate what networked art is and attempt to identify issues that can be addressed or further considered.

With the role of each research method employed in this research now explained in detail, the following discussion will firstly explore aspects of the research methodology that traverse methods and secondly potential issues within methodology. The internet will play a key role in the research's methodology. It will, for example, be employed to gather data as part of historical research and case studies. In many instances, it is anticipated that this will enable the research to gain access to data that would otherwise be inaccessible due to it being rare, out of print or not published. However, as a consequence of the role of networks in the research the internet will be considered as “a wider phenomenon in society and a resonating concept that can be used for research and action” (Lovink, 2011, p. 73). As such, it will be employed as more than simply a research tool or technique. Similar to how electronic and digital technologies are considered as having moved beyond being a tool, the internet will be employed as an environment, along with other types of networks, within which aspects of the research occurs. This will, for example, include art practice developed for the research, in particular, performative practice where the internet will be considered a space within which the practice occurs.

Since the networked art practice discussed is initially proposed as transdisciplinary, the methodology of its research will also be transdisciplinary. The research will employ a number of what are conventionally considered distinct fields and how these coalesce within contemporary art. Therefore, It will involve the research of developments in art that lead to networked art as well as the research of their key technological and theoretical influences. The selection of developments in art has been made based on preliminary research of 20th century art that sought to question conventional concepts of the art form; that is art as precious or even sacred object,

the means of its creation, the role of the artist and the role of the observer. It is hypothesised that art challenging these conventions has allowed for circumstances that contribute to networked art. Given the current relationship between networks in art and electronic and digital technology described in chapter 1.1 the use of technology to address these issues was an essential selection criterion. Art developments selected include cybernetic art, systems art, new media art and relational art. In turn, the selection of their key technological and theoretical influences that are identified in texts as such include cybernetics, systems theory and new media theory.

The discussion of each art development and their technological and theoretical influences will also be selective in the research. The purpose of selective discussion is to ensure that it remains relevant to the overall subject of art and in particular to building a case for networked art while being accurate to the technological and theoretical field it incorporates. For example, the discussion of systems theory will only explore aspects of that field as it relates to concurrent art practice, such as systems art, and the circumstances that contribute to networked art. How and why examples of each art development and their technological and theoretical influences are selected, including all materials gathered to this end as part of historical research, field research and case studies will be to address this purpose.

Collection, organisation and verification of data will occur initially from within the influencing technological and theoretical fields. It will then be cross-referenced with data from within art culminating in a synthesised evaluation and analysis of practice that can be considered antecedent or historical to the proposed networked art practice. As a result of cross-referencing fields, it is intended that the research will in its later stages facilitate transferability of the framework to a breadth of different types of artists who might conventionally associate themselves with a specific medium or movement. Consequently, the research will through a transdisciplinary methodology investigate how disciplinarity is considered within the practice.

There are some methodological issues in the research that will need to be addressed as they arise. How will, for example, the methods and techniques outlined above work together as a result of their combination, in particular within the context of

research that is in equal parts practice and theory? The practice proposed is transdisciplinary and will also employ a number of methods further complicating this issue. Since the research does not adopt an exegesis approach in writing, it diverges in structure from typical practice-based research and aligns itself with practice-led research. Practice-based and practice-led research both involve "research in which the professional and/or creative practices of art, design or architecture play an instrumental part in an inquiry" (Rust, Mottram and Till, 2007, p. 11) and are therefore closely connected. However, this research does distinguish between the two following Frayling's distinction of practice-based research being research through practice and practice-led research being for practice (1993 cited in Sullivan, 2010, p. 77). The ultimate goal of this research is to form a new understanding of an observed practice. As such, the research is primarily practice-led and yet will directly engage with practice as a means of actioning research, a method more commonly associated with practice-based research. This merging of aspects of both modes is not considered inappropriate, on the contrary, it is understood as part of the predicted fluidity between modes en route to a wider acceptance of practice within research (Rust, Mottram and Till, 2007, p. 10).

The research shares features of grounded theory and this also creates a complication in its methodology. It originates in the observation of artistic practice that is largely based on a combination of practice and field work prior to the research's commencement. The research, however, starting with an initial hypothesis of a networked art, bases its outcome, networked art's framework and a demonstration of practice, on the discovery and analysis of data uncovered as a part of methodologies mentioned above. To an extent, this inverts the typical grounded theory paradigm of hypothesis followed by data collection in that data collection was effectively the first step to commencing the research.

1.4 Structure

This section will explain the structure of the research, including the relationship between my art practice and writing as its components, how practice will develop and the order of discussion in the writing's chapters and sections. The research is structured into practice and writing, which through cooperative cycles inform each other. Practice will develop artworks in what can be considered an organic non-linear manner, that is in parallel to each other, in series, in iterative cycles, responsively and so forth, to address different aspects of the research as they emerge. Opportunities that arise during the research will be engaged with where appropriate and relevant to the research. The written component of the research, however, is overall structured chronologically and therefore follows a linear structure. The order of chapters and their sections is intended to move through the development of the proposed networked art from its histories through its framework and finally to a discussion of its practitioners. The purpose of this is to steadily build an account of networked art for the reader, its emergence and rationale, before finally demonstrating examples of it as evidence of a cohesive art form.

Following this introductory chapter, chapter 2 will exclusively discuss networks, outside of the context of contemporary art and the development of electronic and digital technologies. The purpose of this is to demonstrate that networks pre-date specific technologies, such as electronic and digital technologies, and that they are a concept that reoccurs time and again within a number of domains. Building on discussions of networks in the latter part of chapter 2, chapter 3 will discuss a selection of art developments relevant to networks from the mid-twentieth century to the start of the twenty-first century. Combined, chapters 2 and 3 will provide a historical overview of both the contexts and antecedents of networked art. Chapter 4 will develop and discuss the framework of networked art in detail as a result of research in chapters 2 and 3, my practice as research and the observation of the practice of artists. It will adopt the style and language of network studies and its precursors discussed in chapter 3. By doing so, it will relate the framework to network studies, enable the framework to be discussed abstractly, allow it to be applied to transdisciplinary practice and consequently situate networked art as a practice with a conceptual basis. Each section of chapter 4 will discuss my practice

as research as an example of networked art. The first three sections of chapter 5 will apply the framework to other artist's practice and situate my practice in relation to theirs. Each section will highlight emergent processes, themes and content of networked art that have been informed by the pre-history, history and antecedents of networked art discussed in chapters 2 and 3. In the last section of chapter 5, the effectiveness of the framework as a means to communicate networked art will be evaluated and reflected on through the discussion of a series of interviews conducted with key individuals involved in various aspects of the contemporary art world. Finally, chapter 6 will conclude the written component of the research.

1.5 Terminology

Throughout the written component of this research the development of networked art, in particular, the development of its framework from chapter 4 onwards, will employ a specifically defined terminology. Terms that are employed will be introduced and explained directly in the text body. Key terms that will repeatedly be referred to can also be found in the glossary at the back of the written document for quick reference. The first instance of each key term will be indicated in the text body by use of a footnote. Two key terms, however, *'real'* and *'virtual'*,[5] are not introduced or explained in detail in the text body. These are instead employed in writing as already accepted foundational principles for the proposed networked art, how it positions itself in relation to art and its conceptual contexts. While explanations of both these terms can also be found in the glossary for quick reference, this short section is intended to provide an introduction to their conceptual basis.

The definition of the terms 'real' and 'virtual' are based on the overlap of cybernetics, systems theory and ontologies of Jacques Lacan, Giles Deleuze and Felix Guattari. Cybernetics and systems theory predominantly and in equal measure employ the terms concrete and real to define a system (Institute for the Study of Coherence and Emergence, 2012). However, Russell Ackoff equates concrete with objects while Mario Bunge equates it with material, both specifically connecting the term with ideas of materiality. Bunge subsequently adds that “some concrete systems are more than just physical entities, in the sense that the categories of physics are insufficient to account for them” (*ibid*). Bunge's statement implies that the definition of concrete in cybernetics and systems theory attempts to incorporate both what is material and what is real. Real, however, is defined as that which exists, material or immaterial. Concrete, therefore, can be considered a problematic term. It is ambiguous if it is meant to define what is material and will overlap with definitions of what is immaterial. Real can equally be understood as a problematic term as a result of being continually redefined over time to suit different purposes. It is all at once non-specific and therefore can be considered from some perspectives as contradictory in what it encompasses.

5 Throughout this research, please refer to the entries for 'real' and 'virtual' in the glossary as a quick reference.

Consequently, this research proposes the term 'real' as *that which exists regardless of whether it is material or immaterial*. To clarify further two existing ontologies can be employed as a reference for what 'real' entails in this research. These are Lacan's three registers of the Imaginary, the Symbolic and the Real (2000, p. 90) and Deleuze and Guattari's Ontological Quadrivium of virtual/actual and real/possible (Deleuze, 1991, pp. 96–98). Both ontologies are shown in Figure 1.5.1 as overlapping diagrams that map their corresponding terms. 'Real' is, from an experiential perspective rather than a material, time or spatial perspective, understood as the equivalent of Lacan's term real and symbolic combined and Deleuze and Guattari's terms real, virtual and actual combined. This mapping of 'real' to the ontologies terms is shown in Figure 1.5.2. 'Real' is therefore not just that which exists as material or immaterial but also *that which is experienced*.

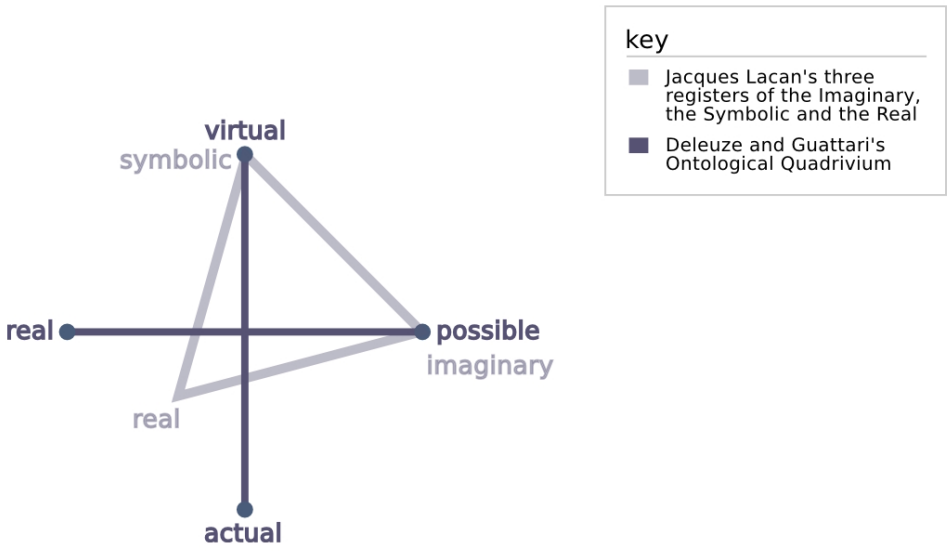

Figure 1.5.1: *The intersection of Lacan's three registers and Deleuze and Guattari's Ontological Quadrivium.*

Single inverted commas are employed to separate out 'real' in the text body and figures as either what is being directly discussed or central to the discussion. However, the inverted commas are also purposefully employed to emphasise a

typographical distinction with real, that is that 'real' is understood by this research as problematic as it is non-specific and therefore can be considered from some perspectives as contradictory in what it encompasses. 'Real' is by no means considered an improvement of Lacan's or Deleuze and Guattari's ontologies. Instead, as a consequence of being embedded in the history of philosophy, the definition is a reflection of how the term is encumbered with definitions that have developed and changed over long periods of time, is frequently employed incorrectly in mass media and often misunderstood in popular culture. 'Real' is problematic, however, its problems are acknowledged and embraced in this research giving the term tensions that equally reflect debates and confusions surrounding it as well as the inadequacies of language to express these fully. A number of these tensions are revealed as part of the artistic practice within this research and discussed in chapters 4 and 5.

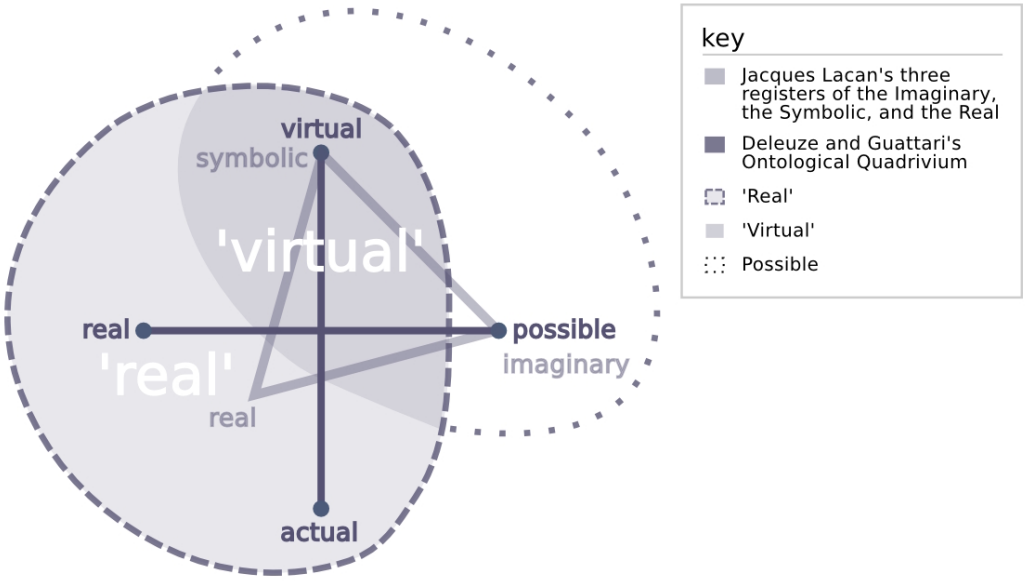

Figure 1.5.2: *The terms 'real' and 'virtual' employed in this research mapped to Lacan's three registers and Deleuze and Guattari's Ontological Quadrivium.*

Virtual also employs single inverted commas as 'virtual' for similar reasons to their use in 'real'. Often understood as the opposite of real, 'virtual' is the equivalent of Lacan's term symbolic and Deleuze and Guattari's term virtual. However, as can be

seen in Figure 1.5.2 'real' also incorporates Lacan's term symbolic and Deleuze and Guattari's term virtual. Therefore, what is 'virtual' is embedded within what is 'real', yet it paradoxically has an antithetical relationship with what is 'real'. 'Virtual' is *that which exists but is specifically immaterial* and is experientially a part of the 'real'.

Chapter 2: Networks introduced

Introduction

As mentioned in chapter 1, the introduction to this research, this chapter will exclusively discuss networks outside of the context of contemporary art and the development of electronic and digital technologies. It will do this by initially discussing networks prior to the Information Age in the twentieth century followed by a discussion of developments in the mid-twentieth century that were influenced by the late industrial and early Information Age. The purpose of this is to demonstrate that networks should not be considered as solely technological constructs associated with specific prevailing technologies, but as a concept that reoccurs time and again within a number of domains. As such, it is proposed that networks pre-date specific technologies and will transcend them.

Research methods employed in this chapter primarily consist of historical research including literature searches, reviews of relevant academic publications, journal articles and conference proceedings. Extensive use of the internet is made to access texts, in particular, rare or inaccessible texts that are only accessible through various research databases and museum collections. Examples of networks uncovered as part of research and discussed in this chapter are considered part of the history of the proposed networked art and therefore locate its origins partially outside of the context of art. The aim in discussing these examples is to build a case that networked art reflects concerns that are larger than the domain of art and have existed over a longer period of time than contemporary conditions in art. Discussion of contemporary art that provides the corresponding part of the history of networked art, in particular, contemporary conditions that have continued through networked art, will be addressed in chapter 3.

Chapter 2 is structured as follows. Chapter 2.1 explores networks prior to the Information Age and the advent of electronic and digital technologies. This period is what I have termed the pre-history of networks. Emphasis is placed on the etymology of network as a visual form. Chapter 2.2 introduces the origins of network studies, how the definition of networks evolve subsequent to their discussion in the prior section and as a consequence of the late industrial and early Information Age. In addition, this section starts to outline a definition of systems and how they relate to

networks. The last section of this chapter, chapter 2.3, finalises the definition of systems through a comparative discussion of cybernetics and systems theory. In the process, two key concepts are revealed as describing a distinction between cybernetics and systems theory. These concepts will inform discussions of the antecedents of networked art in chapter 3 and form crucial components of the framework of networked art discussed in chapter 4.

2.1 The pre-history of networks: visual etymology and evolution

In the middle to late stages of the Information Age networks are currently nowhere more prevalent than in digital technologies. The reason for this is simple. The information referred to in the term Information Age is specifically digital information. The Information Age defines an era where a change in how information is created, stored and distributed has occurred. It has shifted from all information being analogue before the information age to now being predominantly, and perhaps soon exclusively, digital.[6] Digital technologies are the dominant technologies of this age and through networks are creating their own environment for communication. Marshall McLuhan who coined the term the Information Age predicted this scenario in *Understanding Media: The Extensions of Man* when he stated:

> "We live today in the Age of Information and Communication because electric media instantly and constantly create a total field of interacting events in which all men participate" (1995, p. 248).

Manuel Castells adds in *The Internet Galaxy: Reflections on the Internet, Business, and Society*[7] that "the Internet is the technological basis for the organizational form of the Information Age: *the network*." (2001, p. 1, my italics), confirming networks and in particular the internet's importance to society.

To associate networks with only digital technologies is, however, misleading. It suggests that networks may have only ever existed in the Information Age and that their existence is wholly or largely reliant on a technological status quo that positions electronic and digital technologies as the dominant technologies. Networks existed prior to the Information Age. In addition, the use of networks has continued to grow as they are increasingly applied to areas that are not digital such as their use in biology. Technology itself has also been demonstrated as not solely a human

6 There have been sensationalist estimates as to how the amount of digital information currently produced compares to all information produced up to 2003 (Moore, 2011). While there is considerable debate as to how long estimate calculations should cover and to what scale exponential growth should be factored into calculations, estimates demonstrate that information being created is growing exponentially and expected to continue over the next decade (Gantz & Reinsel, 2010).

7 The title of Castell's book and its chapter 'The Network is the Message' are both references to McLuhan, the former refers to *The Gutenberg Galaxy: The Making of Typographic Man* (1962) and the latter refers to McLuhan's phrase, "the medium is the message" (1995, p. 7).

practice (Sagan and Druyan, 1992, pp. 391–399; Leakey and Lewin, 1993, pp. 187–189)[8] and so it must follow that networks, understood technologically or otherwise, can exist outside of human society. However, the consideration of networks in this research is only as a product of human technology, what is termed techne or technical knowledge.[9] The specific context of this research is the application of networks to the domain of contemporary art, which is equally considered as only a human practice.[10]

The purpose of this section is the discussion of networks prior to the Information Age. The section will specifically explore the manner in which networks are entwined with a number of human practices that span systems of belief, society, scientific classification, transportation and communication, the creation of environments, functional artefacts and the representation of spaces. The exploration is intended to demonstrate that networks pre-date specific technologies, such as electronic and digital technologies, and that they are a concept that reoccurs time and again within a number of domains. The discussion will provide a means to propose how the current definitions and uses of networks have been formed as well as how they may be understood to have impacted contemporary art and the framework that will be developed in chapter 4. Definitions of networks as “an arrangement of intersecting horizontal and vertical lines” and “a group or system of interconnected people or things” (Oxford Dictionaries Online, 2014) form a part of current general knowledge. While these definitions share an organisational quality, respectively an arrangement and a group or system, they seem otherwise unrelated and in some respects oppositional. The former suggests visual or surface qualities and the latter form and space. However, they are closely related to how the concept of networks has evolved.

8 Sagan and Druyan discuss the use of tools by chimpanzees while Leakey and Lewin discuss the use of tools by early Homo species.

9 The discussion of technology here refers specifically to technology as knowledge such as the domain of digital technologies as opposed to technology as artefact or product such as a computer as a digital technology (Tabachnick, 2004).

10 While there are frequent cases of 'proof' that animals can make art, these are largely discredited within studies. Greg Laden suggests that what humans define as art is a product of a linguistic brain which only humans possess (2011). Denis Dutton points out that art created by animals is often a result of their limited motor functions, that animals cannot represent things in different ways, have no sense of completion and beyond the act of creation never demonstrate an appreciation for what they have created (2009).

Discussion of networks in this section is framed within two broad concepts that represent these definitions. These are *networks as a visual pattern* and *networks as a functional form*. The concepts are not intended to reflect a separation between the two. On the contrary, examples will demonstrate how visual pattern and functional form, or simply form and function, are invariably combined and often interdependent. By exploring the origins of networks through a pre-Information Age history, their evolution and ultimate emergence as a field of study in the twentieth century, this section will begin to outline a background as to why networks have been co-opted into art in a number of different ways, which will be discussed in later chapters. What follows is not a chronological discussion of the history of networks as such, the non-linear nature of the subject matter alone makes this difficult, nor is it a complete history of networks. Instead, it is a brief discussion of a number of key developments, how they relate to the evolution of networks within contemporary art and in particular the formation of networked art.

The first broad concept mentioned above of *networks as a visual pattern* has a long history, a selection of which will be detailed below. The word network first appeared in print in the Geneva Bible of 1560 (Estrada, 2011, p. 3). It describes a mesh-like visual pattern or “net-like arrangement” (*ibid*) observable in nature or human-made artefacts; a definition that is still largely consistent with today's definitions and coincides with those mentioned above. The definition far precedes transport, media, computing and social networks that we associate with contemporary society and establishes networks as forming part of existing visual culture. Net or mesh-like visual patterns had, however, been used long before the 16th century and are visible in forms of ancient art, including Greek, Celtic, Roman, Byzantine and Islamic art, as well as primitive art from America, Africa, Asia and Oceania. Many of these art forms and their cultures were isolated from each other geographically and historically yet employ reoccurring motifs such as interlocking lines, zig-zags, diamonds, triangles, stars, knots, Y and V shapes to create mesh-like patterns (Sandars, 1995; Werness, 2000; El-Said, 2001; Dunbabin, 2002; Coldstream, 2003).

It is uncertain that mesh-like patterns were anything other than visual repetition. However, art historian Carl Schuster and anthropologist Edmund Carpenter (1996) suggest that patterns, both as surface decoration and sculptural form, were used by

ancient cultures as a means to document life, the passing of time and how generations of people were connected. An example of this they claim is the use of a Y-Post pattern that resembles a tree with a branching structure as a means of documenting lineage (Fig. 2.1.1) and can be dated back to at least the Upper Paleolithic era (*ibid*). Schuster and Carpenter state:

> "the Tree is simultaneously a cosmic man and a tribe whose limbs or branches represent successive generations … the nodes or knots of a branching tree are conceived as tantamount to human 'joints' and act as symbols of propagation" (*ibid*, p. 14).

Mimicking what is seen in nature, patterns according to Schuster and Carpenter were a means of visualising a tribal narrative that extended beyond the individual. They created a continuity across cultures and eras demonstrating a collective instinct as part of the wider human race (*ibid*). Patterns, therefore, are both visually "an arrangement of intersecting horizontal and vertical lines" and symbolically "a group or system of interconnected people" (Oxford Dictionaries Online, 2013).

Figure 2.1.1: *Examples of Schuster and Carpenter's Y-Post patterns. From left-to-right: pottery design from Marajó Island, Brazil; wooden cup design from the Congo; shield design from New Guinea; pottery design from Iran (1996, p. 87).*

It is reasonable to assume that if an individual wished to document their place within their lineage or tribe then as a collective, humanity would want to place itself within its world or universe. Considered in this larger context Schuster and Carpenter's Y-Post or tree as a visual metaphor, not just for human lineage but also for the relationships between species, has a long-established history. In published works alone this extends back to the start of the nineteenth century. A phylogenetic tree, a

diagrammatic tree illustrating evolution for plant species, was first published by the French botanist Augustin Augier in 1801 with the first tree for animals published only eight years later in 1809 by Jean-Baptiste Lamarck in *Philosophie Zoologique* (1830)[11] (Fig. 2.1.2). Both preceded Charles Darwin's initial sketches of evolutionary trees by almost thirty years (Darwin Online, 2003) and the tree in *On the Origin of Species* (1900)[12] by half a century (Fig. 2.1.3).

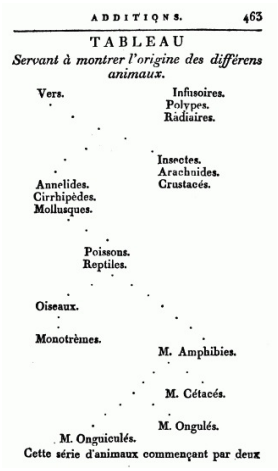

Figure 2.1.2: *Jean-Baptiste Lamarck's phylogenetic tree in Philosophie Zoologique dating from 1809 (1830, p. 463).*

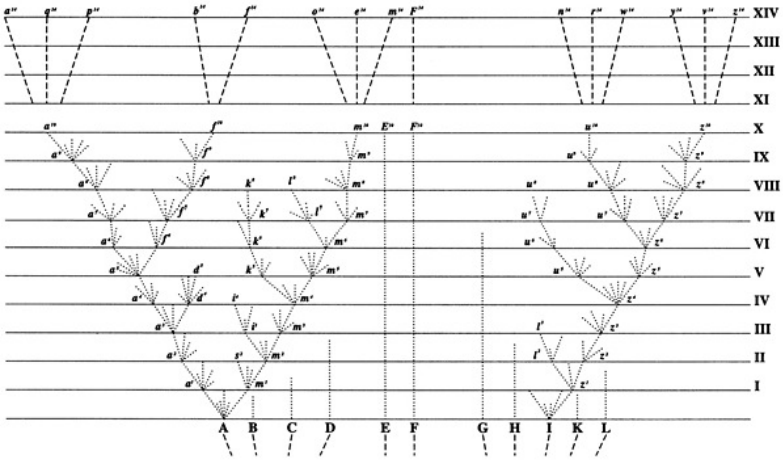

Figure 2.1.3: *Charles Darwin's Tree of Life in The Origin of Species dating from 1859 (1900, pp. 92–93).*

Arthur Lovejoy speculates, however, that the concept of an order or structure of life had already been in existence for thousands of years, a concept that can be traced back at least as far as Plato (Bunnin and Jiyuan, 2004, p. 289). He refers to a hierarchy that he terms the Great Chain of Being, which places humanity in relation to higher entities such as gods, angels and demons and lower forms of life such as animals, plants and minerals:

> "the conception of the universe as a 'Great Chain of Being,' composed of an immense, or — by the strict but seldom rigorously applied logic of the

11 The edition cited is a second edition published in 1830.

12 The edition cited is a reprint of the first edition published in 1859.

> principle of continuity — of an infinite, number of links ranging in hierarchical order from the meagerest [*sic*] kind of existents, which barely escape non-existence, through 'every possible' grade up to the *ens perfectissimum*" (Lovejoy, 2001, p. 59, italics in original).

Lovejoy then supports this by referencing a number of texts, including Dante's Divine Comedy (Bunnin and Jiyuan, 2004, p. 289), to illustrate ideas of biological and spiritual position in the known universe.

There are several problems with Lovejoy's Chain as a concept. Most significant of these is the identification by Georges Cuvier in the eighteenth century of distinct animal categories including "vertebrates, molluscs, articulantes, rayonnés or zoophytes" (Bynum, 1975, p. 20) that had evolved in parallel. This discovery demonstrated that animal categories could not be part of a linear chain pattern. Lovejoy's Chain is not the branching visual pattern discussed by Schuster and Carpenter nor is it a component of a net visual pattern. It allows no parallel movement through it as it is linear by nature. Instead, the Chain is an overarching general arrangement of all life. It demonstrates, through its ideas of hierarchy and links, a general concept of relation that can be identified within different cultures across the world with different religious, philosophical and ideological belief systems spanning millennia.

The Chain is too general a concept. As such, it may suggest that another visual pattern such as a branching one, whether as a means of documenting tribal lineage or humanity's general placement in the universe,[13] is simply a logical visual pattern that appears time and time again throughout history and has no doubt ultimately led to family tree diagrams used in genealogy. In their analysis of ancient and tribal art Schuster and Carpenter are in no doubt about these connections across time when they state:

13 More recently Doolittle and Bapteste (2006) suggest that it is probable a single universal tree structure also cannot be correctly applied to all life, citing prokaryotes as an example of life that if incorporated into a universal tree do not conform genetically with other species. Within the context of this discussion on branching structures as the historical visual origins of networks and specifically how they have been employed in the past, this is however unimportant as it only reflects an ongoing changing view in science of humanity's placement in the universe.

> “Many people equate the branching of a tree with the genetic union & division by which every family, clan or tribe perpetuates itself. They express this association of ideas in language & myth, and visually depict a 'family tree' as anthropomorphic, providing it with appropriate human attributes” (1996, p. 14).

Additionally, they add that the first branch or root of branching visual patterns are invariably a reference to a deified progenitor or god:

> “God & man alike are Trees, the latter in the likeness of, as well as an offshoot of, the former. Traces of this vegetative symbolism survive in many later religions: 'As is a tree, yea just as is the Lord of Trees, is verily the man' (Brihadranyaka Upanisad III:9, 28). 'I am the vine, ye are the branches' (John, 15,5)” (*ibid*, p. 15).

This reference has symbolically survived into the modern era. Consequently, Y-Posts, phylogenetic trees, the Great Chain of Being and family trees are each humanity's attempt to place itself within its world or universe over time. The majority of these have a visual basis with a frequent occurrence of a net pattern.

Networks, however, have not simply been a visual pattern used for a symbolic purpose. They have also been employed as a *functional form*, the second broad concept mentioned at the start of this section, and in many cases that too has often been connected with symbolic meaning. From the outset, Schuster and Carpenter illustrate that the net's component, the branching pattern or Y-Post, has been a functional form used in architectural supports and ladders (*ibid*). They also refer to net or mesh-like patterning on textiles that have been scratched, stitched or coloured (*ibid*), however, there is little discussion of weaving as a functional form that is based on the net. A woven material is a net of intersecting and interconnected fibres or flexible materials arranged in horizontal and vertical lines. It provides a surface for a pattern, however, by employing fibres with differing colour or texture the material can through the structure of the weave be conceived to incorporate pattern. Evidence of weaving has been dated from 15,000 to 10,000 B.C.E. at Faiyum, Egypt (Bunson, 2002, p. 117) and has been used for a number of different functions including basketry, wattle-based construction, textiles and fishing nets. As such, weaving bridges the gap between visual pattern and functional form, and provides one of the

earliest and best examples of the two definitions of a network as “an arrangement of intersecting horizontal and vertical lines” and “a group or system of interconnected people or things” (Oxford Dictionaries Online, 2013) coinciding.

The net in weaving is considered a symbolic uniting or connecting device in the myths, legends and fables of many cultures. For example, in Greek mythology, the net is the interlocking threads of each person's destiny (Smith, 1867, p. 254). In Christian fables, it is religion uniting humanity through belief (The Bible, Matthew. 13:47; *ibid*, Mark. 1:17; *ibid*, Matthew. 4:19). While in Navaho mythology, it enables greater human self-reliance promoting harmony with nature (O'Bryan, 1956, pp. 37–38). Each instance suggests that the art or technology of weaving predates culture and is consequently rationalised as a God-given or supernatural technique. As a result, weaving as a functional form is laden with symbolic meaning.

There is no clear evidence that the variety of net patterns used to weave basketry, wattle-based construction, textiles and fishing nets are related as the time separating these in history is lengthy. Elizabeth Siewertsz van Reesema suggests they are not related and that each process reflects a relationship “between the nature of the material at hand and what is done with it at the time” (Broudy, 1993, p. 11). In other words, pliable fibres are possible to weave into a net or mesh-like form that result in a greater whole and consequently, this is what occurs. Similar to a branching structure emerging as a logical visual pattern across cultures and time, weaving can be considered as a logical functional form that appears time and time again throughout history to address a number of requirements. Equally, however, it can be speculated that the time between the development of each type of weaving could be the time required to allow tools and techniques such as spinning to develop enabling more sophisticated types of weaving. Whether weaving evolved time and time again as a logical functional form or more linearly is uncertain, however, weaving as a net or mesh-like form demonstrates functionality that is applied in numerous ways and is more sophisticated than visual patterns discussed above.

The discussion above focuses on examples of networks as visual patterns and functional forms that have the symbolic purpose of establishing a human’s place in the universe over time in relation to Gods, humanity as a whole, animals and plants.

A network's “arrangement of intersecting horizontal and vertical lines” represents therefore non-specific individuals within “a group or system of interconnected people” (Oxford Dictionaries Online, 2013) such as a tribe. The following discussion of networks as visual patterns and functional forms can be said to concern humanity's position in the universe in relation to material space, understood as a “system of interconnected … things” (*ibid*), as it is discovered, inhabited and subsequently visualised. The net or grid became a means to represent space in order to divide, arrange and measure it systematically. It was applied in a number of ways to spaces that can be broadly defined as either generalised or representational spaces.

Grids are used as a representation of space for example in both non-board games, such as Noughts and Crosses, Crosswords, Bingo and Hopscotch to name a few, as well as many board games (Mac White, 1945; Murray, 1952; Bell, 1980 a; Bell, 1980 b; Parlett, 1999; Pennick, 1992; Robinson, n.d.; Suckling, n.d.). The pieces and spaces of board games that continue to be played today were to our ancestors highly representational of life (Parlett, 1999, p. 6) and this was particularly true of the Chess family of games. Chess has long been associated with war, its pieces representing the armies of opposing countries (Davidson, 2010, p. 7). In the present, however, the pieces of Chess have become symbolic of history and are associated with patterns of movement within the game.

The board of Chess as a net or grid has continually been an abstraction of space. It has altered in dimensions and colour over time with the distinctive black and white in current versions thought to have only appeared after the game arrived in Europe between the 11th and 12th centuries (*ibid*, p. 144). The board of Chess has never represented a particular country, kingdom or land. Instead, it represents a space to be inhabited, moved through and ultimately controlled. If the game is considered as an analogy of war with its pieces as opposing armies, then the black and white of the Chessboard can be interpreted to represent the land or country of the opposing armies or perhaps the battlefield itself (Murray, 1952, p. 53). As such, the board is symbolic of the timeless conflict over space with the pieces representing the particular cultures, tribes or lineages playing it.

Cartography also employs the net or grid as a means to represent space. Unlike the

board of board games the space represented in maps is not an abstraction of space, it is a reductive representation of the spatial relationships between things. Depending on the experience of a space or the context of when it is mapped, maps may be either subjective interpretations of a space according to the maker's exploration, knowledge, belief system, political motivation or they may be objective representations, scaled and accurately documented according to agreed standardised means. Generally, over time maps have progressed from subjective interpretation to objective representation as advances in mathematics, measurement and technology have been made. These advances include, in particular, the development of geometry, which employs grids extensively for measuring, and coordinating systems such as latitude and longitude used for positioning.

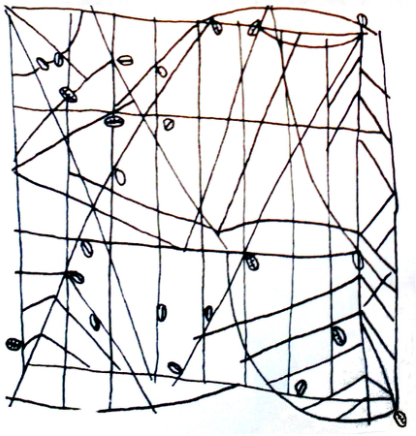

Figure 2.1.4: *A Marshall Island stick map or Wapepe (Cooper Hewitt, n.d.).*

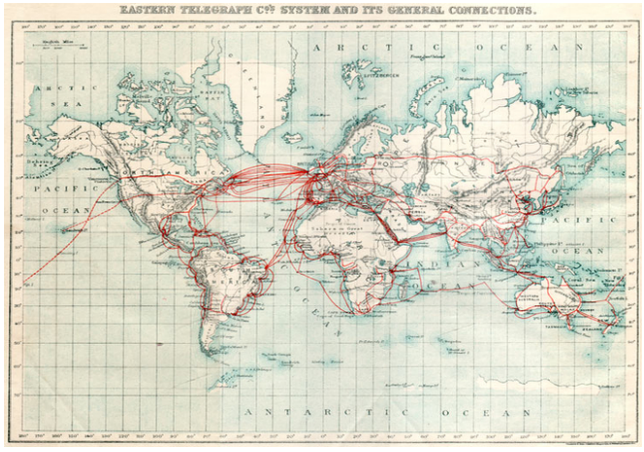

Figure 2.1.5: *The Eastern Telegraph Company system and connections map, 1901 (Map Monkey, 2012).*

Navigation stick maps made by the Marshall Islanders called *rebbelib*, *medo*, *mattang* or *wapepe* (Fig. 2.1.4) dependent on use (Canoes of the Marshall Islands, 2014), employ a woven net or grid of coconut palm ribs. They serve as interpretations of a space according to the maker's exploration (Genz, *et al.*, 2009). The stick maps demonstrate the subjective interpretation type of map mentioned above and do not document the size, contour and position of each landmass in relation to another as modern westernised maps do. Instead, lines on the stick maps document the sea swells, prevailing winds and routes (*ibid*). Islands are intersections of those lines, sometimes marked with pieces of coral (Werness, 2000,

p. 194), and their purpose is to visualise destination, the endpoints of mapped routes and contributing influence on swells. No indication is given of distance, island size or contour. It has been suggested that as subjective interpretations, the stick maps act as personal mnemonic devices rather than maps in western society that are reproduced and shared (*ibid*).

An example of the objective representation type of maps mentioned above was the use of maps in the division and enclosure of land for agriculture in many countries. In this process scaled maps were designed with a grid based on land measurements. Hedges and ditches were then constructed by employing the map and applying the grid to the land to divide it. Unlike the use of grids on most maps such as latitude and longitude lines that indicate distance and as such are a symbolic representation of existing space, the grid in this instance was created or manifested in existing space to transform it. The function of the map was therefore not as a representation but as a plan to that end. The use of a grid in the division and enclosure of land gave control over space. Farmers could calculate how the land could be best used, maximising crop growth or grazing stock and enabling yield to be calculated more easily. In turn, this had an impact on other aspects of agriculture such as how the land could be leased or sold based on size (Overton, 2004, pp. 72–74).

By the mid-nineteenth century, networks had become more closely associated with technologies of transportation and communication including rivers, canals, railways, electrical and telegraph cables (Estrada, 2011, p. 3). The pre-modern emphasis of networks as symbolic or representational forms that connect across time, such as how humans placed themselves in an evolutionary sense in relation to Gods, humanity as a whole, animals and plants, or networks as connective across representations of space, such as those employed in board games and maps, now changed to allow the use of networks as connective across space. Transportation networks enabled the movement of goods, people and energy to distant spaces more rapidly than ever before while communication networks enabled information to be transmitted quickly and to many people at once.

The start of the twentieth century saw unprecedented technological advances. Once again networks were adapted to new uses; foremost of these was their use within

communications. Communication technologies were well-established industries at the start of the century. By 1892 an estimated 246,872 kilometres of telegraph cable had already been laid worldwide (United States Department of the Navy, Bureau of Navigation, Hydrographic Office, 1892 cited in Headrick and Griset, 2001, p. 560) connecting countries and continents (Fig. 2.1.5). The transition from encoded communication such as Morse code sent by electrical transmission to vocal communication sent by electromagnetic transmission had also been in progress since the late 1870s (Munro, 1891, pp. 188–190). Radio was a new cableless or wireless technology. Initially developed for communicating vocally it would soon give rise to the new media form of broadcasting employed for mass entertainment. Radio would ultimately be superseded by television over a twenty to thirty year period from the 1930s onwards with the development of television sets by several countries (Tvhistory.TV, 2013) and the establishment of several national television broadcasting corporations (Canada Science and Technology Museum, 2013).

Each of these communication technologies employed the terminology of networks. Telegraph and telephone infrastructure consisted of global networks of cable, literally “intersecting horizontal and vertical lines” of communication which cut across landscapes and under seas to form “a group or system of interconnected people or things” (Oxford Dictionaries Online, 2013). Cable-based communication technologies, therefore, continued to retain the visual properties of networks. Networks were still *patterns that connect* (Schuster and Carpenter, 1996), only now the pattern was the infrastructure of a technology employed to communicate globally and directly, specifically person to person, and not a symbolic visual communication passed from generation to generation within a geographically tied community. Lines of cable communication networks often existed in close proximity to transportation networks such as roads and railways (Headrick and Griset, 2001, p. 551; Munro, 1891, p. 33) and they began to be represented as lines on maps. While transportation networks enabled individuals to move more freely beyond their village, province or country, breaking down communities that had largely been formed as a result of geographic proximity, communication networks allowed dispersed individuals to be connected as a new type of community. As a result of these technological advances in the twentieth century, there has been a form of rearrangement of space and time. Marshall McLuhan states that in fact “time, in a

sense, has ceased and space has vanished" (1966). Consequently, humanity's reach has been extended (1995). Ultimately these advances have given rise to the modern era's "global village" (McLuhan, 1962, p. 21); the phenomenon of proximity within a geographically small area such as a village experienced on a global scale.

Over the period communication technologies were developed, evolved and in many instances replaced each other, visual evidence of network infrastructures as patterns of lines or mesh-like arrangements disappeared as technologies moved from cable-based to cableless communication networks. An example of this is demonstrated in the gradual but steady replacement of the telegraph with radio. For the first time in history a network as an arrangement, group or system could become uniquely metaphoric. Links between the points of transmission and reception in cableless communication technologies were no longer cables across a landscape or represented as lines on a map. The links became less important than the places of transmission and reception themselves.

Cableless technologies such as radio and television both continue to employ the terminology of networks. They are often referred to as broadcast networks and have evolved into a form of popular entertainment rather than purely communication. In broadcasting contexts for entertainment, a network is still referred to as a type of communication that has different infrastructure configurations of transmission and reception points. These entail one-to-one or point-to-point communication that allows signal transmission and reception from both points involved in the communication and one-to-many communication or broadcasting, a one-way communication consisting of a point of signal transmission and typically many points of reception.[14] It should be noted that the latter of this can be visualised with a tree diagram. However, network also became the term for the organisation who provided the entertainment in programmed time-slots as a station or channel, demonstrating that in the early days of radio and television, networks were already starting to become an everyday term.

14 One-to-one communication is employed in two-way radio systems for citizens band radio or between members of public services such as the emergency services. One-to-many communication or broadcasting is employed for entertainment and public service announcements directed at the general public.

The purpose of this introductory section has been to provide a pre-history of networks that discuss them in their broadest sense and explores how their definition has evolved. Examples discussed above are a select sample of how networks have been employed in a number of ways from earliest history to the mid-point of the twentieth century. Each use within each context has been purposefully chosen to illustrate how diverse and interdisciplinary the uses of networks have been, a characteristic that has continued to grow in the twentieth and twenty-first centuries. As such, the examples provide the groundwork for the development of networks in the twentieth century and ultimately as discussed in this research their impact on contemporary art. Some degree of emphasis has been placed on networks as having foremost visual origins. In each example, the discussion has returned to the visual applied in symbolic, abstract and representational ways. Three main points on networks should be noted that will be incorporated in subsequent sections. These are:

1. The progressive use and application of networks can be considered as dependent on the progress of human technology in its largest sense.

2. Networks until the twentieth century were, regardless of the context, visual or had a visual aspect that was highly important.

3. As they have evolved, networks have progressed through two general stages. Each is distinct but can incorporate the previous. These are:

    a. Time:

        - Networks as a symbolic visual representation of humanity's placement in the universe over time, visual patterns are an example of this.

        - Networks as functional form imbued with a symbolic visual representation of humanity's placement in the universe over time, weaving is an example of this.

    b. Space:

        - Networks as a visual abstraction of space, board games are an example of this.

- Networks as a visual representation of space, maps are an example of this.

These points combine from the late nineteenth and early twentieth century onwards to become networks as a means of rearranging space and time, which are demonstrated in transportation and communication networks.

2.2 The emergence of network studies: defining systems and networks

In the nineteenth and early twentieth century the increase in the applied functionality of networks to a number of fields such as communication, media and transport discussed in chapter 2.1, enabled the rapid identification of networks as an area meriting research. Since the eighteenth century, new specialised fields of science had increasingly been created through the division of labour[15] as a means of increasing returns to scale[16] (De Langhe, 2010). Rather than initiate a specialised field for networks what was required was an exploration of networks in a non-disciplinary way in order to tackle the breadth of fields in which networks were being applied.

Cybernetics and systems theory addressed this and this section introduces them. The section discusses how networks evolved after those discussed in chapter 2.1 and as a consequence of the late industrial and early Information Age. As a result, the section continues to demonstrate that networks pre-date specific technologies, such as electronic and digital technologies, and during this period emerge from a concept that reoccurs time and again within a number of domains as a defined area of study. In addition, the section starts to outline a definition of systems and how they relate to networks, which will be developed further in chapter 2.3.

The term network was not the principle term employed in studies at this time. System was used almost exclusively and consistently. Current non-specialist definitions for both system and network overlap significantly and as such do not clarify why one term would be used almost universally across cybernetics, systems theory and indeed many of the fields they would later inspire. The definitions are highly problematic as each term uses the other to define its meaning[17] creating a

15 The continually increasing specialisation of work in modern society, termed the division of labour, was coined by French Sociologist Émile Durkheim in his PhD thesis '*De la division du travail social*' — On the division of work in society (1893, my translation). The separation of biology as a study of living organisms from natural history, which started in the eighteenth century, is an example of the division of labour.

16 The tenet that more specialists equate to more focused research, a larger scientific community and overall increased knowledge.

17 The *Oxford English Dictionary*, for example, uses network within the first definition of system and system within the second definition of network.

narrowly circular definition which may not be informative.

System, originally from Greek meaning a “whole compounded of several parts or members” (Liddell and Scott, 1940), is a term that has a long history of use in the sciences and engineering. Engineering used the term to refer to machines as complex collections or arrangements of mechanical parts working together to perform a task (Atkins and Escudier, 2013, p. 369; Engineering Dictionary, 2008). From the 17th century onwards science begun to use the term as it was influenced by the increasing mechanisation and industrialisation of society, a result of the development and growing complexity of engineering. Mechanism, “a paradigm of explanation modelled on mechanics and holding that everything can be explained by the mechanistic principle” (Bunnin and Jiyuan, 2004, p. 418), was subsequently established within science and can be considered as the first attempt at studying systems. Mechanism had both exponents and opponents. Its opponents proposed a theory of vitalism[18] defined by Georg Ernst Stahl in 1707 as a theory of:

> “the existence of a vital force, the vitalistic essence, called by him 'soul,' which characterized all living organisms, and more generally all living matter in contradistinction to inanimate matter” (Weckowicz, 2000, p. 6).

While both mechanism and vitalism date as far back as ancient Greece (Sumner, 1916, p. 103), mechanism rapidly became the prevailing view from the 17th century onwards. Sciences such as biology or psychology were influenced by and even modelled on artificial systems,[19] which was highly paradoxical as machines are built by humans. The fundamental mechanical parts of most machines such as the lever, joint, bearing and so forth are based on nature including joints in the human body.

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18 In addition to vitalism, there were various other related lesser theories such as biologism, a theory of studying biology from a biological point of view.

19 The most enduring mechanism metaphor is that of the human body as a mechanism, which itself has led to metaphors of the brain as a computer and DNA as information (Vaccari, 2003, pp. 3–4). Notable uses in studies prior to the period in discussion include: Thomas Hobbes comparison of man and “Automata (Engines that move themselves by springs and wheeles as doth a watch)” in *Leviathan: Or the Matter, Forme, and Power of a Common-Wealth Ecclesiasticall and Civill* (1968); René Descartes discussion of man as machine in *Traité de l’homme* — Treatise of Man (1972); Julien Offray de La Mettrie's development of Descartes discussion that man “is a machine which winds its own springs” in *L'Homme machine* — The Man Machine (1748); and Sigmund Freud's use of steam metaphors for human psychology as a “process of getting rid of one’s own emotions by ‘blowing off steam’” (Freud and Bunker, 1960, p. 144).

The start of the twentieth century saw a surge in academic writing concerned with mechanism and vitalism. Mechanism was still the prevailing view in the sciences, however, vitalism was gaining support (Weckowicz, 2000, pp. 7–9). Voiced in Henri Bergson's *Creative Evolution* (1907), Hans Driesch's *The Science and Philosophy of the Organism* (1908) and *The History and Theory of Vlitalism* (1914), each traced historical theories for and against vitalism (Sumner, 1916, p. 103). A number of scientists working in the natural sciences including James Johnstone, Johannes Reinke and Jakob von Uexküll among others also defended vitalism and cumulatively initiated what can be considered as neo-vitalism (Iannone, 2013, p. 543).

Norbert Wiener, Ross Ashby, Warren McCulloch and Ludwig von Bertalanffy, key figures in the emergence of cybernetics and systems theory, were all acutely aware of the mechanistic-vitalistic controversy in science and yet all employ to a greater or lesser degree the term system laden with its mechanistic associations. In *Cybernetics or Control and Communication in the Animal and the Machine*, the first full-length publication to specifically name cybernetics and develop its theory, Wiener only defines a system generally as having inputs and outputs (1949, p. 116). However, he goes to great lengths to pay homage to developments in mechanistic fields. He refers to two important first steps towards the development of cybernetics; an article on governors by Clerk Maxwell in 1868[20] as “the first significant paper on feed-back mechanisms” and the steering engines of ships as “the earliest and best developed forms of feed-back mechanisms” (*ibid*, p. 19). Additionally, he states that cybernetics is “the entire field of control and communication theory, whether in the machine or in the animal” (*ibid*), the phrase that gives the publication its title, listing machine before animal though the latter inspired and invented the former.

Wiener's intent in *Cybernetics* is to refer to both machine and animal as effectively equivalent. However, he does this by considering them both as systems, which is a problematic starting point. System as a term at this time was already a part of the history of mechanism. The mechanist-vitalist controversy was still being debated and experiencing a renewal of interest, so any use without some form of clarification or

20 See 'On Governors' (Maxwell, 1868).

redefinition tended to build on those mechanistic foundations. Additionally, as a consequence of its ambitious scope of study *Cybernetics* would require being understood by many disciplines. If Wiener hoped to establish cybernetics as a field that explored the “no-man's land between the various established fields” (*ibid*, p. 8) and to formulate a “common terminology” (*ibid*, p. 19) for all involved,[21] effectively making cybernetics an interdisciplinary field, he needed to clearly define the term system as it related to cybernetics and disassociate it from mechanistic definitions.

Instead, Wiener only touches on the mechanist-vitalist controversy briefly and, with what is evidently some contempt, refers to it as having already “been relegated to the limbo of badly posed questions” (*ibid*, p. 56) in his opinion. When later writing *The Human Use of Human Beings: Cybernetics and Society* (1950) Wiener calls the controversy a “question-begging epithet” (*ibid*, p. 32). According to the temperament he was known to have, this has been remarked as his “question-closing epitaph” (McClintock, 1966, p. 251) on the matter. While Wiener may have felt that mechanism did not require any serious consideration, his brief mention of it combined with his consistent and yet unclearly defined use of the term systems suggests that he was still caught up in the mechanist-vitalist controversy with a bias towards mechanism.[22]

Von Bertalanffy, the founder of systems theory, also employs the term system, however, with a different emphasis. This emphasis may be as a result of his background in biology and a notably different attitude concerning the mechanist-vitalist controversy. In *Modern Theories of Development: An Introduction to Theoretical Biology* he addresses the debate more directly than Wiener and states that “from the methodological standpoint … we see that 'mechanism' and 'vitalism' by no means form the mutually exclusive disjunction they have been supposed to do” (1933, p. 29). Similar to Wiener (1949, p. 8), von Bertalanffy discusses the scientific methodology of division and specialisation (2008, p. 104) widely employed since the

21 Wiener lists a number of fields in the introduction to *Cybernetics* in which networks were becoming important. These include engineering, computing, mathematics, neuroscience, psychology, sociology, anthropology and biology (1948).

22 Additionally, it is worth noting that while the term mechanist-vitalist is only referred to once in *Cybernetics*, machine is the third most employed term after system and information. However, combined with its variants, such as mechanism, mechanical and so forth, it is employed a total of two hundred and eighty times, far in excess of system and its variants.

separation of biology from natural history in the eighteenth century. For von Bertalanffy however, mechanism is reductive and as such a direct cause of the methodology of division and specialisation (*ibid*, p. 110). In a subsequent publication, he states that it is in effect too narrow a theory.

> "Mechanism … provides us with no grasp of the specific characteristics of organisms, of the organization of organic processes among one another, of organic 'wholeness,' of the problem of the origin of organic 'teleology,' or of the historical character of organisms … We must therefore try to establish a new standpoint which — as opposed to mechanism — takes account of organic wholeness, but … treats it in a manner which admits of scientific investigation" (1933, p. 46).

The theory of 'wholes' proposed, a holistic philosophy, effectively advises that organisms must not be reduced to their parts to understand them. By 'wholes' von Bertalanffy refers to concepts "indicated by expressions such as 'system,' 'gestalt,' 'organism,' 'interaction,' 'the whole is more than the sum of its parts' and the like" (2008, p. 112). In doing so he equates the terms organism and system, redefining system as a general term in the process that is not necessarily mechanistic.

Von Bertalanffy also implies in turn that organism should not be restricted to any vitalistic viewpoint. Each term, organism and system, is simply a means of expressing something that consists of parts. In *Problems of Life* von Bertalanffy elaborates on his definition of a system, making sure his use of the term is once again qualified as a general term:

> "A 'system' can be defined as a complex of elements standing in interaction. There are general principles holding for systems, irrespective of the nature of the component elements and of the relations or forces between them" (1952, p. 199).

Von Bertalanffy developed his standpoint as a theory under the title General System Theory, which was formally identified in 1945 in a paper written in German (1972, p. viii-ix). It would not, however, be until 1950, two years after Wiener's *Cybernetics*, that his explanation of the theory would be translated into English in a paper titled 'An Outline of General System Theory' (2008). A full detailed discussion only followed in

1968 in his book *General System Theory* (1972), which became the key reference in the field of systems theory. It is perhaps as a result of this long process of development that von Bertalanffy's consideration of what a system is, how it should be defined and studied that has enabled his discussion to be more detailed and adaptable than Wiener's.

Use of the term system by Wiener and von Bertalanffy must be considered within the context of its time, that is pre-computer networks and in particular in advance of the internet as the Advanced Research Projects Agency (ARPA)[23] was not founded until 1958 (DARPA, n.d. a). The era *Cybernetics* and *General System Theory* were written in could still be considered the late industrial age, the dominant paradigm of modern society for more than a hundred and fifty years. Ultimately this would be replaced by the Information Age, which was slowly emerging with the development of global communications. However, it would only make its full impact with the invention of modern computing, which was at that time in the early stages of being initiated by Vannevar Bush, Alan Turing and Claude Shannon among others, all of whom are mentioned as contemporaries of Wiener in Cybernetics.

As cybernetics and systems theory developed so did the definition of systems to accommodate interdisciplinary research. John Johnston reflects on this in *The Allure of Machinic Life; Cybernetics, Artificial Life, and the New AI*, stating that in order to treat machine and animal equally systems discourse “tended to speak of machines in terms of living organisms and living organisms in terms of machines” (2008, p. 29). Combined with the transition of mechanism in the early Information Age from science to popular culture these factors contributed to misconceptions about cybernetics, including that it is the development of cyborgs.[24] Vitalism meanwhile has predominantly been discredited in scientific circles as its connections with a vital force, in a sense a soul, have been deemed impossible to substantiate and therefore

23 The Advance Research Projects Agency (ARPA) became the Defense Advanced Research Projects Agency (DARPA), the more commonly known acronym, in 1972 reverting to ARPA from 1993 and finally back to DARPA in 1996 (DARPA, n.d. b). Their research can be considered as the earliest significant technical step towards the development of computer networks such as the internet.

24 Pangaro states that “the advent of the prefix 'cyb' or 'cyber' as a referent to either robots ('cyborgs') or the Internet ('cyberspace')” (Pangaro, 1990) has diluted cybernetics' meaning “to the point of serious confusion to everyone except the small number of cybernetic experts” (*ibid*, 1990). He adds that it “is neither robotics nor freezing dead people” (Pangaro, 1988).

unscientific.

There is purpose to the use of the term system within early cybernetics and systems theory. Over time system has come to be understood by both as a term that is not integrally linked to either organic or inorganic, natural or artificial. However, any type of system should be considered as being broadly one of two types, either an organismic system or a technological system. Historically these have been discrete entities in material form. Industrial age technologies, such as cable-based and cableless communication (see chapter 2.1), followed by the Information Age's development of these, changed this by allowing systems that can be *combinations of organismic and technological* (McLuhan, 1995). Additionally, whether as discrete or combined entities, they *can exist without material form*. Each of these types of systems can be classified as existing or 'real' and should therefore not be equated to what is concrete or material alone (François, 2004, p. 584 b).

By having passed through two distinct technological ages in the twentieth century, systems have been associated with the predominant system metaphors of those ages; that is as a mechanism in the industrial age and as a network in the Information Age. In these contexts systems, therefore, conform and/or overlap with many definitions of mechanism and network, such as the OED's definition of network discussed in chapter 2.1. Defined as such it begins to explain the association of system and mechanism at the time of inception of cybernetics and systems theory. The Information Age was only just beginning at this point, so consideration of networks as a type of system was not yet possible. A mechanical metaphor was the most dominant metaphor available at the time that could be applied to systems enabling researchers from a number of disciplines to understand it. It allowed them to share a common ground within which to collaborate and yet by not being specifically mechanistic, the term system could ultimately shift away from such metaphors.

It is proposed that networks should, therefore, be considered a subset of systems that emerged within the Information Age. Consequently, definitions of system that do

not evoke a mechanistic metaphor apply to networks.[25] Cybernetics and systems theory, while discussed in this chapter within the context of networks, should be referred to collectively as systems studies. Systems studies are required to study the larger set of systems and not to inherently link themselves to a specific type of system, such as mechanical systems or networks, which may be associated with a limited number of fields; essentially contradicting their objectives of establishing themselves as interdisciplinary fields of research. Ten years after the publication of *Cybernetics* Russell Ackoff stated:

> "In the last two decades we have witnessed the emergence of the 'system' as a key concept in scientific research. Systems, of course, have been studied for centuries, but something new has been added … The tendency to study systems as an entity rather than as a conglomeration of parts is consistent with the tendency in contemporary science no longer to isolate phenomena in narrowly confined contexts, but rather to open interactions for examination and to examine larger and larger slices of nature. Under the banner of *systems research* (and its many synonyms) we have also witnessed a convergence of many more specialized contemporary scientific developments … These research pursuits and many others are being interwoven into a cooperative research effort involving an ever-widening spectrum of scientific and engineering disciplines. We are participating in what is probably the most comprehensive effort to attain a synthesis of scientific knowledge yet made" (1959 cited in von Bertalanffy, 1972, p. 9, italics in original).

Ackoff suggests that both Wiener and von Bertalanffy's over-arching aim of enabling disciplines to collaborate and the start of a dramatic shift in the methodology of science to consider the treatment of wholes rather than the reduction to parts was successful. From a technological perspective, not linking the emerging interdisciplinary systems studies to a specific type of technology can also be

25 The entry for System as a network in the *Encyclopedia of Systems and Cybernetics* (Institute for the Study of Coherence and Emergence, 2012) supports and precisely elaborates the type of subset networks are of systems. It states: "A system self-generated as a network should be first self-organizing and later on self-regulating: i.e. It constructs its own internal determinism, by progressive reciprocal emergence of self-generated constraints" (*ibid*).

considered crucial as technologies are continually emerging, transient and/or through a combinatorial evolution (Arthur, 2009) or compositing process (Sterling, 2005) absorbed into new technologies.[26] Naming cybernetics or systems theory as a networked field of study would as mentioned above have been irrelevant to the prevailing thought and technology of the time. It would have incorporated existing definitions of networks, some of which may not have been relevant (see chapter 2.1), or would have entailed the fields becoming speculative sciences concerning the future rather than addressing existing scenarios of systems.

While still at the nascent stages of the Information Age in the early 1970s Gilles Deleuze, a philosopher, and Félix Guattari, a psychiatrist and political activist, developed their concept of a network in *A Thousand Plateaus: Capitalism and Schizophrenia* (2004). They called their concept the rhizome. In many respects, the rhizome is a bridge between the cybernetics and systems theory concept of a system (Smith and Protevi, 2013) to network concepts that would emerge later in the Information Age and consequently needs to be explained before any discussion of that period. While the rhizome coincides with the Information Age, it was not intended to reflect systems in technological spheres but instead to shift the focus of discussion from organismic, mechanistic and technological systems "to the social, linguistic, political-economic, and psychological realms" (*ibid*, 2013). The rhizome is defined by Deleuze and Guattari as having six characteristics. These are:

1. "any point of a rhizome can be connected to anything other, and must be" (Deleuze and Guattari, 2004, p. 7);

2. A rhizome "ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles [and it is] not only linguistic, but also perceptive, mimetic, gestural, and cognitive" (*ibid*, p. 8);

3. "Multiplicities are rhizomatic … There are no points or positions in a rhizome,

26 Combinatory evolution (Arthur, 2009) and the concept that technologically "Tomorrow composts today" (Sterling, 2005, p. 14) are two closely related theories that demonstrate a general move in science and technology studies away from Darwin-like models of technological evolution. In opposition to trial and error over time in Darwin's theory of evolution, these theories suggest that in fact "every technology stands atop a pyramid of ancestral ones that eventually made it possible; that all future technologies will derive from those now existing" (Arthur, 2009).

such as those found in a structure, tree, or root" (*ibid*, p. 8–9);

4. "A rhizome may be broken, shattered at a given spot, but it will start up again on one of its old lines, or on new lines … Every rhizome contains lines of segmentarity according to which it is stratified, territorialized, organized, signified, attributed, etc., as well as lines of deterritorialization down which it constantly flees" (*ibid*, p. 10);

5. "a rhizome is not amenable to any structural or generative model [it is] a map and not a tracing" (*ibid*, p. 13).

6. A rhizome "is open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification. It can be torn, reversed, adapted to any kind of mounting, reworked by an individual, group, or social formation … it always has multiple entryways" (*ibid*, p. 13–14).

Deleuze and Guattari contrast tree-like structures, similar to those discussed in chapter 2.1, to the rhizome. They state that the former are "centered (even polycentric) systems with hierarchical modes of communication and preestablished paths" while the latter "the rhizome is an acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automaton, defined solely by a circulation of states" (*ibid*, p. 23). They explain that the rhizome consists of "finite networks of automata in which communication runs from any neighbor to any other, the stems or channels do not preexist, and all individuals are interchangeable" (*ibid*, p. 19).

Determining a coherent definition from the language used by Deleuze and Guattari in their explanation of the rhizome is challenging. It is deliberately embellished with many adjectives, visually suggestive and quite often contradicts itself. They borrow a term from botany for their concept and yet refer to it as consisting of automata interconnected (*ibid*, p. 19); a term historically employed in relation to machines. They define the rhizome as having points, lines and plateaus. The rhizome can be broken or shattered as if it is an object or structure and yet it has no points or positions (*ibid*, p. 7–9). In fact, it has little that pre-exists, is constantly in flux (*ibid*, p. 8) and so cannot be an object or structure. The rhizome is intended to be an adaptable metaphor, which can be applied to a number of different scenarios, in a

sense carrying on the interdisciplinary intent of cybernetics and systems theory. Not alone is this expressed in the definitions in *A Thousand Plateaus* but also in its rhizomic structure, which the authors encourage the reader to start reading from any point (*ibid*, p. 24).

The rhizome as a metaphor has proliferated quickly within new media studies. In 'Rhizome@Internet using the Internet as an example of Deleuze and Guattari's "Rhizome"' (1996), Robin Hamman builds a convincing argument demonstrating how the internet meets the requirements of each of Deleuze and Guattari's six characteristics of a rhizome (Wray, 1997). Rob Shields makes similar claims in his editorial introduction to *Cultures of Internet: Virtual Spaces, Real Histories, Living Bodies* (1996, p. 9). Andre Lemos discusses France's Minitel system as a rhizome, which is also in Shields' publication (ibid, pp. 33–48), while Ilana Snyder's *Hypertext: The Electronic Labyrinth* (1997) discusses hypertext as rhizomatic. However, Ken Hillis, again in Shields' publication (1996, p. 96) and George Landow in *Hypertext 3.0: Critical Theory and New Media in an Era of Globalization* (2006, p. 61–62) warn of over applying the rhizome as a metaphor. They state that it was contrary to Deleuze and Guattari's intent of suggesting that one particular idea should be accepted as absolute truth.

With the gathering speed of network technological development in the nineteen-eighties and the advent of the internet in the public domain in the early nineties, several definitions of a network began to appear that share commonalities and incorporate earlier definitions of networks including system and rhizome. Some definitions are purposefully inclusive of all or many types of networks while others specifically tackle the emerging new media technologies. Klaus Krippendorff, for example, describes a network as "a system of channels, communication links, paths of information flows, roads, etc., resembling a fabric or wiring diagram and describable as a graph" (1986 cited in Principia Cybernetica Web, 2002 a). Krippendorff's definition reflects both historical definitions of networks by including channels and roads as well as newer definitions such as electronic circuitry and digital media. Most notable, however, is the inclusion of fabric referring to weaving (see chapter 2.1), a reminder that networks can pre-date both information and industrial age technologies, and the description of a network as a graph suggestive

once again of some of the visual origins of networks (see chapter 2.1).

Bruno Latour's definition of specifically technological networks is more focused on their direct relation to space and place. He states, networks:

> "are composed of particular places, aligned by a series of branchings that cross other places and require other branchings in order to spread. Between the lines of the network there is, strictly speaking, nothing at all: no train, no telephone, no intake pipe, no television sets. Technological networks, as the name suggests, are networks thrown over spaces, and they retain only a few scattered elements of those spaces. They are connected lines, not surfaces. They are by no means comprehensive, global or systematic, even though they embrace surfaces without covering them, and extend a very long way" (1993 cited in Stalder, 2006, p. 186).

Similar to Krippendorff, Latour evokes visual characteristics but develops these further. A network is once again fabric-like, however, it can be thrown over a space and therefore has characteristics of the mesh of weaving as well as the grid employed in games and mapping (see chapter 2.1). A network is connected lines, not surfaces or nodes such as a telephone or television set, and is therefore reminiscent of cable-based communication networks such as a landline telephone network and transportation networks such as the railway (see chapter 2.1). The idea of a network as a set of connections rather than nodes is echoed by Pierre Musso, when he states that a network is "an unstable structure of connections" (2003 cited in *ibid*, p. 178). However, Manuel Castells places both connections and nodes on an equal footing by repeatedly stating that a network "is a set of interconnected nodes. A node is the point at which a curve intersects itself" (Stalder, 2006, pp. 169–170).

All definitions of systems and networks discussed above aim to be inclusive by offering a unifying or holistic theory. As such, they can be considered a continuation of developing terminology for an interdisciplinary field, an essential component of early cybernetics. However, inclusive definitions are broad and arguably can sometimes be meaningless. This issue is raised many times in different contexts employing networks. For example, Fritjof Capra discussing networks from principally

a biological and social perspective states that “wherever we see life, we see networks” (Capra, 2002, p. 9). The same idea is echoed by Christopher Vitale (2009) who discusses them from a media and visual culture perspective. Josephine Berry-Slater in the context of a review of the exhibition *net_condition*[27] states that the term network alone “has nearly become a cipher for saying 'everything' with the proviso that 'everything' be framed by technology” (1999).

Castells definition of networks as part of the network society is one such broad definition and criticism of being meaningless is frequently directed at him. Markus Perkmann calls his definition an “empty signifier” (1999, p. 623) while Jan A.G.M. van Dijk calls Castells definition “one-dimensional” (1999). Felix Stalder addresses these criticisms in his study of Castells and explains:

> “Castells tends to offer very broad and general definitions that shift much of the explanatory work to their empirical application. This is partly a result of his strategy of 'communicating theory by analysing practice,' partly a consequence of the enormous scope of his claim: networks are becoming the preferred way of organizing in virtually all domains of social life” (2006, p. 170).

Stalder then adds:

> “Rather than a single, unified perspective, the theory of the network society is best thought of as a set of interrelated propositions whose relations with one another can be (re)arranged according to the practical analytical task at hand. Instead of postulating a new hierarchy of causes and effects, the theory points to the continuous interdefinition of self-conscious and creative actors, constituting three irreducible yet highly interdependent sources of dynamism: the capitalist economy, politics, and culture. In this sense, Castells applies the logic of networking to his own theory: it is flexible, without fixed hierarchy, with no clear beginning or end, contains not one but many points of view, and is easily reconfigurable, with elements to be dropped or added ('disposable

27 *net_condition* was an exhibition of net art at the Centre for Art and Media Technology (ZKM) in Karlsruhe, Germany (23/09/99–27/02/00).

> theory'), yet it is still integrated and comprehensive. The theory as a whole is larger than the sum of its parts because it manages to identify, empirically and theoretically, a unifying trend across the many domains it covers: the emergence of a new type of social organization, informational networks, superseding vertically integrated hierarchies as the carrier of dominant social processes. This new morphology provides the signature of the new era, hence the network society" (*ibid*, p. 200).

From Stalder's perspective, Castells' definition of networks is perhaps the most comprehensive to date. Rather than employ the single, unified and holistic approach of systems studies to be interdisciplinary, it is instead inclusive because its approach is broad and configurable. Castells considers his theory as itself a network; it is more than the sum of its parts, mimicking von Bertalanffy's concept of wholes, and there is no fixed hierarchy with a beginning or end, similar to Deleuze and Guattari's rhizome. As a result, his definition synthesises aspects of networks preceding it and can be demonstrated in action. While Castells may indeed have defined networks in a way that is not meaninglessly broad and Stalder defends this view convincingly, applying the subject matter of the theory to itself may be an exercise in self-reflexivity; a return to the type of circular definition discussed at the outset of this section.

2.3 Cybernetics, the study of behaviour; Systems theory, the study of arrangements

Networks are a subset of systems that emerged within the Information Age (see chapter 2.2) therefore cybernetics and systems theory, or collectively systems studies, play a key role in the history of networks in the twentieth century. Systems studies in the twenty-first century continue to have much to offer the study of networks as it remains a highly active area. However, it is not the interdisciplinary unified field of study that Wiener envisaged. Instead, starting with different origins, cybernetics and systems theory have remained distinct and today have many more variations conceived to suit different problems, application and schools of thought (Umpleby and Dent, 1997, pp. 2–3). Why do cybernetics and systems theory continue to exist separately when one of their primary aims was to develop an interdisciplinary field that unified researchers with a holistic methodology as an alternative to the division of labour?[28]

This section addresses this question through a detailed comparative discussion of cybernetics and systems theory as it has a bearing on the proposed networked art's attitude on transdisciplinarity. The section moves the discussion forward from the technological and organismic distinction defined by Wiener and von Bertalanffy within the context of the mechanist-vitalist controversy in chapter 2.1. Through the finalisation of a definition of systems, the section focuses on current thinking about key points of systems studies and how these reflect concerns of the Information Age, part of the context of the proposed networked art. In the process, two key concepts are revealed as describing the key distinction between cybernetics and systems theory. These concepts will inform discussions of the antecedents of networked art in chapter 3 and form crucial components of the framework of networked art discussed in chapter 4.

Some scholars maintain that systems theory is a subset of cybernetics while others

28 Wiener, von Bertalanffy and many other key figures in cybernetics and systems theory initially came together in a number of meetings between 1942 and 1947 with precisely this aim of unifying researchers under one field of study. Many of the meetings were supported by the Josiah Macy Foundation and would later become known as the Macy Conferences (Wiener, 1949, pp. 19–33).

that cybernetics is a subset of systems theory (Arnold, 2014, p. 46; Scott, 2004, p. 1369). Gordon Pask, however, states that distinctions between the two are of no significance (Institute for the Study of Coherence and Emergence, 2012). All of these perspectives are in a sense true because each one is based on a scholar's disciplinary origin. Both Wiener and von Bertalanffy's technological and organismic definition of systems (see chapter 2.2) conform to this. Their perspectives are based on their disciplinary origins. In order to understand how cybernetics and systems theory relate to each other and accommodate different perspectives, a partial agreement with Pask's attitude in this matter is required. Therefore, as Pask states there exist distinctions between cybernetics and systems theory and these will be discussed in this section as the reason for their maintained separation. Theory will not, however, be shaped as a means to rationalise differences or widen the distinctions between cybernetics and systems theory (*ibid*). Unlike Pask, this research considers the distinctions of "practical significance" (*ibid*) because it enables networked art to position itself historically and philosophically in relation to network and systems studies.

Stafford Beer, a theorist and consultant who applied cybernetics to management, describes cybernetics in *Decision and Control: The Meaning of Operational Research and Management Cybernetics* as studying:

> "the flow of information round a system, and the way in which this information is used by the system as a means of controlling itself: it does this for animate and inanimate systems indifferently. For cybernetics is an interdisciplinary science, owing as much to biology as to physics, as much to the study of the brain as to the study of computers, and owing also a great deal to the formal languages of science for providing tools with which the behaviour of all these systems can be objectively described" (1994, p. 254).

William Ross Ashby, a psychiatrist who became one of the leading pioneers in cybernetics, describes cybernetics in *An Introduction to Cybernetics* as treating "not things, but ways of behaving. It does not ask, 'What is this thing?' but 'what does it do?'…. It is thus essentially functional and behavioristic … The materiality is irrelevant, and so is the holding or not of the ordinary law of physics" (1956, p. 1).

Beer's and Ashby's definitions together with Wiener's definition of cybernetics as being “the entire field of control and communication theory, whether in the machine or in the animal” (1949, p. 19) have clear commonalities. There is no mention of any mesh-like patterns, which had previously applied to networks up until the twentieth century; instead, each definition refers to either material non-specificity or the complete absence of materiality.

Wiener's statement initially opens up the potential of cybernetics as being applied to all machines and animals, while Beer goes a step further by stating that it applies to all “animate and inanimate systems indifferently” (1994, p. 254). Ashby, however, eliminates any focus on a thing and states more clearly than others that “materiality is irrelevant” (1956, p. 1) in cybernetics. Instead, what is important is the behaviour that emerges from the relationship between things. By removing the focus from a thing, Ashby resolves the issue of disciplinary perspectives within cybernetics. Cybernetics can be considered as the study of behaviour within systems; not what a system is but what a system enables. It can, therefore, be concluded that systems are not just technological or organismic (McLuhan, 1995), constructed or natural or what Wiener terms as machine or animal (1949, p. 19). Neither are they as Beer states animate or inanimate (1994, p. 254), a contrast based on locomotion. All of these are merely distinctions of materiality. Instead, cybernetic systems can be classified as encompassing all material and immaterial systems, or what is termed in this research as all 'real' and 'virtual', as well as possible systems.

In contrast to cybernetics study of systems, systems theory adopts a different approach to the study of systems. It is expressed pragmatically in the *Encyclopedia of Systems and Cybernetics*:

> “no 'point of view' and no 'universe of discourse' on systems could exist without the simultaneous existence of something on which these subtle arts can be practised and which is generally called 'concrete system', or perhaps more imprudently 'real' system” (Institute for the Study of Coherence and Emergence, 2012).

Systems theory therefore prioritises the thing itself (Ashby, 1956, p. 1), a system as an entity (Ackoff, 1959 cited in von Bertalanffy, 1972, p. 9), how the arrangement of

its parts, their interaction and connectedness effectively leads to a structure or a whole that is more than the sum of its parts (Principia Cybernetica Web, 2002 b). Unlike cybernetics, systems theory is only interested in systems that exist materially with manifestable applications and not the study of systems as a possible concept.

The distinction between cybernetics as studying the behaviour of all systems 'real', 'virtual' and possible, and systems theory studying the structure of only material systems is of key significance to each of their foundations, methods and research. Cybernetics is a field with a basis in mathematics, physics (Arnold, 2013, p. 46; Bateson, 1979, p. 227; Wiener, 1949, p. 19) and engineering. As such, it frequently uses logico-mathematical formulae, themselves systems of abstract language, to explain the concept of different types of systems.[29] Systems theory, on the other hand, has a close relationship with applied fields such as biology and the social sciences, for example, von Bertalanffy was a biologist, which it explains through written discourse or illustrates in diagrammatic form (Gergely, 1979, pp. 45–46).

Additionally, cybernetics initially focused on isolated systems, commonly referred to inaccurately as closed systems. Closed systems are “able to absorb and emit energy and information, but not matter…it should clearly be distinguished from the isolated system concept [which] does not absorb or emit anything” (Institute for the Study of Coherence and Emergence, 2012). Isolated systems do not, therefore, interact with their environment through input or output. They tend to be only possible systems and lend themselves more easily to being described through systems of abstract language such as mathematics. Systems theory, however, focused on open systems from the outset, that is systems that do interact with their environment, because, as von Bertalanffy maintained, systems “by their very nature and definition are not closed systems” (1972, p. 39). From a systems theory perspective then all material systems are open as they exist in a defined environment. This is evident in biological systems for example, which take input such as nutrients, gases and so forth and produce output such as motion, heat and waste.

In the context of the discussion in chapter 2.1, systems theory can, therefore, be

29 For a discussion of this basis in mathematics and further interpretations of cybernetics that are not possible to explore here see 'The Different Meanings of Cybernetics' (Drozin, 1976).

seen to continue the long-established tradition of applying systems. It employs networks as material, functional systems, which can often be seen in their entirety (although increasingly this is not the case) or represented visually as a structure. Cybernetics, on the other hand, considers the behaviour of a system as an emergent property; that is that complex behaviour, a non-visual or 'invisible' aspect of a system or network, can be created through the arrangement, interaction and connectedness of parts or nodes and is often represented symbolically. Because of its treatment of behaviour rather than a thing, cybernetics is more capable of conceptualising systems, material, immaterial or possible, while systems theory, focused on the thing itself, demonstrates a more comprehensive understanding of a material system's structure and the relationship between its parts.

Other points can and have been discussed as distinguishing between cybernetics and systems theory. For example, the consideration of possible or material systems termed indirect and actual by Tamás Gergely (1979, pp. 45–46), closed or open systems (Bertalanffy, 1972) and even mathematical or biological systems (Arnold, 2013, p. 46). Nevertheless, it is suggested that these are secondary differences influenced by the perspective of key figures, such as the mechanistic and mathematical influence of Wiener on cybernetics and the biological influence of von Bertalanffy on systems theory, or are a result of cybernetics' focus on system behaviour and systems theory's focus on system structure.

> "we might say that systems theory has focused more on the *structure* of systems and their models, whereas cybernetics has focused more on how systems *function*, that is to say how they control their actions, how they communicate with other systems or with their own components … Since structure and function of a system cannot be understood in separation, it is clear that cybernetics and systems theory should be viewed as two facets of a single approach" (Principia Cybernetica Web, 2002 b, italics in original).

Cybernetics and systems theory should therefore not be considered as a split or division of labour, but rather as two allies with shared methodologies, research and overall objectives that only differ in focus within the project of systems studies (Gergely, 1979, pp. 46–47). As a result of this they, through combination, treat

systems as a whole and adopt a holistic methodology for studying systems. As such, distinctions between the two can and should be considered as a means of distinguishing between their research.

Consequently, it is proposed that within the context of this research cybernetics should foremost be considered as a *general study of system behaviour* and systems theory as a *general study of arrangement to form a system's structure*. Viewed holistically they are “two scientific approaches, organically complementing each other” (Gergely, 1979, pp. 46–47) and pushing each other forward. In essence, systems theory identifies or builds systems and maps their structure while cybernetics studies the behaviour of systems and its emergent properties. This proposed relationship between systems theory and cybernetics raises several issues which all stem from or are influenced by the question, how precisely do arrangement and behaviour relate to each other within systems studies? The arrangement and behaviour relationship is cyclical with each part of the relationship influencing or feeding back on the other. Elements are arranged to act on each other, cumulatively creating behaviour and it is this which qualifies the arrangement of elements as a collection of nodes in a system or network (Backlund, 2000). The behaviour that emerges within the system is a result of the arrangement. Arrangement, to an extent, initially defines or shapes what behaviour can occur. In turn, behaviour can feed back into the system, completing the cycle, re-arranging the nodes as a means to a modified or new and perhaps more efficient or complex behaviour. This adaptation can occur as a result of the system configuring itself internally, or if it is an open system as a response to external input. The identity of the system or network is therefore dependent on the collective behaviour of the nodes; it is in effect a holistic arrangement.

In order to understand the relationship between arrangement and behaviour, it is necessary to understand the process of identification of a collection of nodes as a system. It is mentioned above that what qualifies a collection of nodes as a system is their arrangement to act on each other. This statement is true. However, an initial factor must be considered. The identification of a system requires that “there must first be given an observer (or experimenter); a system is then defined as any set of

variables that he selects from those available" (Ashby, 1960, p. 16).[30] It is in this that a significant complexity arises; if an observer selects nodes to be identified as a system or network, they have an initial influence or input on the system. Consequently, the system must be open as von Bertalanffy postulates all material systems are (1972, p. 39). More importantly, since the observer has an input on the system, it questions whether the observer is, in fact, a part of the system and whether the system remains the same following that input. Heinz von Foerster discusses this central issue.

> "In working to derive functional models common to all systems, early cybernetic researchers quickly realized that their 'science of observed systems' cannot be divorced from 'a science of observing systems' — because it is we who observe" (1974 cited in Pangaro, 1990).

Alexander Backlund provides a sophisticated discussion of systems in a paper titled 'The definition of a system' (2000) that addresses and largely resolves this issue. In Backlund's definition, Ashby's observer is not automatically assumed to be part of a system because of input to the system. Firstly, a system should not be defined by "any specific kind of relation (like interaction)" (*ibid*, p. 448), so the process of selecting elements to be nodes is not a sufficient criterion for the observer to be considered a part of a system. Secondly, "if an element affects parts of the system but is not affected by it [or] if an element is affected by parts of the system but does not affect any part of the system" (*ibid*) then it is outside the system.[31] This, therefore, allows only three possible types of elements: those that affect a system but are not affected by the system (Fig. 2.3.1); those that do not affect a system but are affected by the system (Fig. 2.3.1); and those that both affect and are affected by the system.

30 Ashby's statement implies that the observer is human however it should be noted that Pask defines observers as "men, animals, or machines able to learn about their environment and impelled to reduce their uncertainty about the events which occur in it, by dint of learning" (1968, p. 18). Both use masculine pronouns however it can be assumed this is of little importance to the discussion. For a full definition of observer as it relates to this research, please refer to the glossary.

31 Whether an element is part of a system or not according to the conditions of affecting or being affected by, it conforms to Newton's third axiom or law of motion. Newton's law states that "to every action there is always opposed an equal reaction: or the mutual actions of two bodies upon each other are always equal, and directed to contrary parts" (Newton, 1687, p. 83).

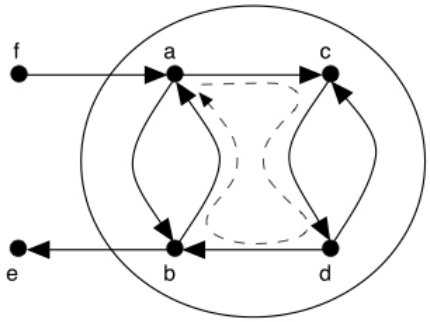

Figure 2.3.1: *Element (f) affects a system (a, b, c, d) but is not affected by the system. Element (e) does not affect a system (a, b, c, d) but is affected by the system (Backlund, 2000, p. 449).*

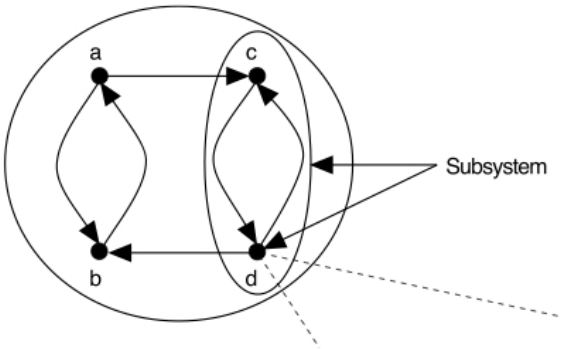

Figure 2.3.2: *The system (c, d) is a subsystem of the suprasystem (a, b, c, d) as it affects and is affected by it. Element (a) affects (c, d) and is an example of an observer. Element (d) is affected by (c, d). Neither (a) or (b) are part of (c, d) however they are part of (a, b, c, d) (Backlund, 2000, p. 450).*

According to Backlund, it is only in type three that elements can be considered nodes within a system. Ashby's observer, therefore, can only be part of a system if affecting and being affected by the system; that is there must be bi-directional behaviour. It is clear that the process of selection by an observer is an affect on a system as it defines it, even if only initially. However, whether a system then affects an observer is more complicated. An observer, called S1, is both a biological system and a social being that is part of society as a system. As such, they are a system and are a part or node in at least one system. By selecting elements and identifying them as a system, called S2, S1 has already changed the identity of the elements. They are no longer independent. They are nodes; co-dependent parts of S2. This change of identity is fed back and registered by S1. It may inform subsequent behaviour by S1, if any, with S2 and so S2 is in turn affecting S1, initially and possibly in an ongoing manner. The process of identifying S2 and the resulting feedback of its status change to S1 creates yet another but larger system within which both S1 and S2 are incorporated. Backlund terms this system, called S3, a suprasystem (*ibid*, p. 449). So in total, there are three systems: the observer S1 as a biological system, the system the observer identifies S2 and the new suprasystem S3 that incorporates both of the former systems as subsystems. In Backlund's diagrams (Figs. 2.3.1 and 2.3.2) these are respectively labelled as (a), (c, d) and (a, b, c, d). Each system may

continue to exist independently, merge or dissipate dependant on ongoing bi-directional behaviour. For example, if the process of creating S2 only entails its identification/feedback and S1 and S2 do not continue to affect each other, then S3 will cease to exist.

Continuing to use the terms observer and system as distinct entities should now be seen as highly problematic. While on the one hand, they do identify S1 and S2 as potentially two different types of systems, both are also nodes within S3 and therefore in a sense equal. However, it is the meaning of the term observer, a term that typically defines a non-behaving role, which is most problematic. It can be viewed as an unfortunate terminological remnant of pre-systems studies methodologies, such as the division of labour, where an observer is classed as external, non-influencing and impartial to that which is observed; a position that is rarely achieved.

Pask identified issues surrounding human observers in pre-systems studies methodologies, in particular when the system being observed involved human participants. He proposed instead that a normative paradigm should be accepted where the observer can and quite often does act on the system causally (1975, p. 13–19); that is they create ongoing input in relation to the system's output. He states that in reality, many "observers act as participants" (Pask, 1980, p. 399) and that "an observer who comes to know the system must be a participant in the system" (Pask, 1996, p. 352). This change is in effect a paradigm shift from what was predominantly considered as observation in pre-systems studies to predominantly participation in systems studies. The observer once thought to be positioned outside or without the system, now becomes the *participant within*. The observer S1 in the example above without a doubt affects/inputs/behaves on S2. While the term observer was still commonly used at the time of Ashby's discussion,[32] it now requires reconsideration in light of developments within the Information Age, communication theory, interaction

32 Claude Shannon, for example, did much to develop an understanding of how parts of a system communicate and function. His paper 'A Mathematical Theory of Communication' discusses how within communication systems, such as the telephone and radio, signals can be optimised through encoding and compression, error can be corrected, and noise can be reduced. For Shannon however, communication was an engineering issue, and while discussion of human input is without a doubt suggested as a behaving role, he only employs the term observer (Shannon, 1948, p. 20–21).

theory and new media theory to name a few.

While the term observer was employed, at no point in the history of systems studies does there appear to be an influential or enduring discourse concerning the true nature of observation, that is as a behaving or non-behaving role, and whether systems studies should continue to employ is as terminology. Discussion employing observer has somewhat confusingly been consistently active rather than passive. Pask's observation that observers were in reality participants (1980, p. 399), influencing a system rather than observing it, was part of a growing recognition of this issue. It prompted the development of second-order cybernetics and ultimately obliged a move away from the use of the term observer in theoretical discourse. By the late 1970s, many engaged in systems studies were in agreement that the observer could not be considered as a non-behaving role on the system they observed. Stuart Umpleby sums up the shift in systems studies at the time as follows:

> “first order cybernetics dealt with interaction among the variables in a system. Second order cybernetics, on the other hand, focuses attention on the interaction between the Observer and the system being observed” (Umpleby, 1979, pp. 11–12).

Terms such as conversation (Pask, 1968; Pask, 1975), behaviour (Ackoff, 1981, p. 15–16), relation (van Gigch, 1991, p. 30; Klir, 1991, p. 5; Langefors, 1995, p. 55), influence (Jones, 1982, p. 45; Flood and Carson, 1993, p. 53), exchange relation (Podolny and Page, 1998, p. 59) and affect (Backlund, 2000, p. 448) became common in systems studies. Each was employed to define system-related behaviour with only occasional instances of the use of the term interaction (von Bertalanffy, 1972). By the late 1980s however, the term interaction was frequently employed (Rafaeli, 1988, p. 111; Miller, 1995, p. 17; Skyttner, 1996, p. 35). This change and almost complete consensus in terminology must be viewed as a culmination of events, including:

- Developments in information and communication theory;
- The birth of computing and in particular a significant emphasis on interface

design for man-machine interaction (Norman, 1986);

- Comparisons of human and computer, such as the brain as computer and DNA as information (Vaccari, 2003, pp. 3–4), a new variant of the human body as mechanism metaphor that influenced psychology, social science and in turn the aspiration to create artificial intelligence by modelling a computer on the brain;
- Changes in media involving on-demand, individual or personal media;
- The development of mass consumer computer technologies and as a result of the volume of coverage in popular media, their high visibility (McMillan, 1999).

However, it must also be attributed in part to recognising theoretical developments in systems studies that provided an important springboard within the newly emerging Information Age to the theoretical discourse of new media. New media is effectively a new paradigm in the relationship between humans and media as information, within which the concept of human-computer interaction is central.

Interaction, a combination of the prefix 'inter-' meaning between or among (Oxford Dictionaries Online, 2014) and action, places the observer within a system and empowers them to affect and be affected by the system; it enables them to be a behaving node. The observer consequently becomes a *user*[33] of the system, they interface with it, in a causal relationship (Pask, 1975, p. 13–19). The user interacts with the system purposefully (Rosenblueth, Wiener and Bigelow, 1943) for a response, creating a feedback loop or a decision cycle model (Kirsh, n.d.). It can be assumed that the system is itself purposive, that is its nodes are collectively identified as a system as a result of the user's initial interaction. It is true that this assumes a 'real' system, material or immaterial and perhaps excludes possible systems. However, the term interaction offers advantages over prior terminology.

Relation (van Gigch, 1991, p. 30; Klir, 1991, p. 5; Langefors, 1995, p. 55) and exchange relation (Podolny and Page, 1998, p. 59), for example, suggest nodes having a one-to-one interaction, which would potentially make them a subsystem and this is not always the case. Influence (Jones, 1982, p. 45; Flood and Carson, 1993,

33 For a full definition of user, please refer to the glossary.

p. 53) and affect (Backlund, 2000, p. 448) both suggest that a node may change another on a one-by-one basis, that is action without response. This manner of change may be correct in some systems but would cause a short life span in many systems. Behaviour (Ackoff, 1981, p. 15–16) should be understood as the totality of interaction within a system, so behaviour and interaction cannot be used as interchangeable terms. Finally, conversation (Pask, 1968; Pask, 1975), perhaps the most rigorously conceived term,[34] implies only scenarios where a user, a human, is involved and so it too is not equivalent to interaction in its largest sense. It is in this final point where interaction proves flexible as it carries no such implication. Interaction allows not only scenarios of user-to-user and user-to-system interaction but also system-to-system interaction and multiple combinations thereof such as users-to-systems, systems-to-systems and so forth.

34 Conversation in Pask's context of human learning systems both builds on accepted conventions of language as key to learning and metaphorically as a term for affect.

Chapter 3: Antecedents of networked art

Introduction

With an overview of the evolution of networks, their suggested origins and development into a science and philosophy in the twentieth century (see chapter 2), now complete it is necessary to shift the focus to contemporary art, the principal subject of this research, and how it came to incorporate networks. This chapter discusses a selection of art developments relevant to networks from the mid-twentieth century to the start of the twenty-first century. It provides an overview of these developments as antecedents of networked art and, combined with chapter 2, provides a historical context for the emergence of networked art. In addition, the chapter starts to explore the question of how contemporary art practice can engage with technology and yet not be defined by technology (see chapter 1.1) by investigating various aspects of the selected art developments as a means to informing the framework developed in chapter 4. Research methods employed in this chapter include historical research, field research and case studies. Historical research will entail a combination of literature searches, reviews of relevant academic publications, journal articles and conference proceedings. However, exhibition catalogues and artist's publications will also be made use of, in particular in connection with exhibitions visited as part of field research, as a means of informing case studies of artists.

The modern era in art incorporating modern art and contemporary art, the latter of which can be loosely classified as postmodern art, commenced in the mid to late nineteenth century and continues today. There are notable contributions in the early half of the twentieth century that merit discussion in relation to some concerns of an emerging systems studies. These include Cubism, Futurism and Constructivism as movements and practitioners such as Duchamp (Shanken, 2002, pp. 6–7). This research, starting with this chapter, however, will only consider a selection of artistic developments since 1949, the publication date of Wiener's *Cybernetics*, to directly examine the impact systems studies has had on art.

Since 1949 there have been numerous art developments and artists who have aligned themselves with or been influenced by systems studies and can be attributed as having an impact on the conception of this research's proposed networked art.

This chapter, unfortunately, can not provide a complete history of all the developments within this period as it is a substantial and complex undertaking beyond the scope of the research. Instead, the purpose of the chapter is to discuss four developments during this time, each as a chapter section, which built and developed numerous system or network strategies.

The four developments are cybernetic art, systems art, new media art and relational art. These are chosen as the principal influences in the formulation of the framework of networked art, which will be introduced in the following chapter. The developments are considered as containing important concepts that have contributed to a particular discourse in art in the modern era, which was already well in progress, and together form a narrative that leads to the form of practice that networked art embodies. Additionally, the four developments overlap considerably with practitioners either influencing or being included in subsequent developments and their concepts being addressed and developed in new ways.

There are many other art developments that are not discussed or are only briefly touched on. These include performance art, mail art, kinetic art, conceptual art, video art, telematic art and net art to name a few. These have each contributed to the narrative, however, are either in part already captured by the included developments, such as the inclusion of net art as part of the discussion of new media art, or share commonalities, such as the intersection of systems art and conceptual art practitioners. As such, the chapter is not intended to be a complete history of networked art but instead to outline the most important series of occurrences that led to its conception.

3.1 Cybernetic art

This section explores the first of the selected developments considered as a key part of the history of networked art, cybernetic art. It does this through the artworks of two of its most important artists and specifically addresses the question of why systems studies were co-opted by contemporary art. The first artist to be discussed is Nicolas Schöffer.[35] Predominantly considered a kinetic sculptor (Kostelanetz, 2001, p. 550) in his time as a consequence of the form his practice took, Nicolas Schöffer adopted what is in effect a conceptual basis of cybernetics to treat space, light and time[36] in his sculptures (Habasque, 1963. p. 16). Artworks from 1947 onwards, notably the *Spatiodynamique Horloge* — Spatiodynamic Clock (Schöffer, 1963, p. 23 b) (Fig. 3.1.1) and *Spatiodynamique 3* — Spatiodynamic 3 (*ibid*, p. 22 b) (Fig. 3.1.2), demonstrate theoretical and artistic concerns with many of the key concepts being explored in cybernetics at the time such as relationship and affect. Schöffer, however, does not articulate these concerns as cybernetic in origin and instead refers to his own coined term Spatiodynamism, “the constructive and dynamic integration of space in a plastic work” (Schöffer, 1963, p. 20 a)[37] as their conceptual basis. It is unlikely that Schöffer had an awareness of systems studies at this time, however, his concepts should not be seen as extraordinary in themselves but instead be considered within the broader context of art in the modern era.

This broader context, what I term as the grand-project of art in the modern era, has very much been about questioning conventional concepts of the art form; that is art as precious or even sacred object, the means of its creation, the role of the artist and the role of the observer. Artists such as Vladimir Tatlin, Alexander Calder, Marcel Duchamp, Lásló Moholy-Nagy, Yves Klein, Jean Tinguely and Dziga Vertov had already experimented at great length with “process, kinetics, interactivity, audience-

35 Nicolas Schöffer (1912–1992), Hungarian born, French artist.

36 Motion is implied as part of Schöffer's space-time. Additionally, the artist is known for his notable music collaborations juxtaposed with his use of light.

37 The term plastic used by Schöffer refers to *les arts plastiques* — the plastic arts in French. It has its origins in a type of art classified by Immanuel Kant in *Critique of the Power of Judgement* as “die bildende Kunst” (2002, p. 198). Wide in definition, translations of “die bildende Kunst” (*ibid*) into English and French equivalents are often contradictory or mismatched. English translations state that it is a pictorial art (*ibid*) and as such indicates the origins of the term visual arts. French translations, however, state that it is a formed, thereby plastic, art that expresses ideas to the senses, so is material and as a result visual and tactile.

participation, duration, and environment" (Shanken, 2002, p. 6) as a means to formulating new modes of artistic practice. Schöffer's pre-cybernetic sculptural artworks of the late 1940s and early 1950s are firmly rooted in established sculptural concerns addressing the relationship between form and space. His term, Spatiodynamism, for example, inverts the conventional concept of sculptural form in space by exploring how it can incorporate, enclose or define a space thereby creating notable comparisons to architectural concerns that would emerge time and time again in his later artworks (Habasque, 1963. pp. 10–11). Additionally, Schöffer's concern with "real movement" (*ibid*, p. 11) in art and not just its representation is indicated several times in his monograph of 1963, including the categorisation of his artworks into those with 'real' movement and those which incorporate movement, such as light and movement. These categorisations situate his art as a descendant of early twentieth-century Hungarian avant-garde artists and what has been termed as Viennese Kineticism, which explored the representation of movement.[38]

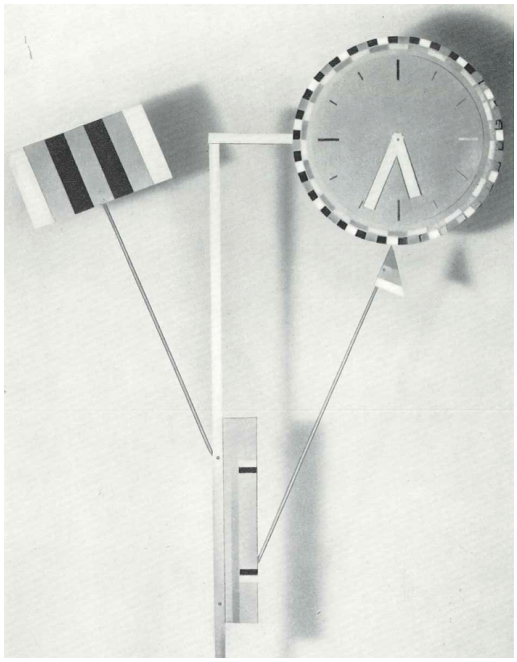

Figure 3.1.1: *Spatiodynamique Horloge — Spatiodynamic Clock (Schöffer, 1963, p. 23 b).*

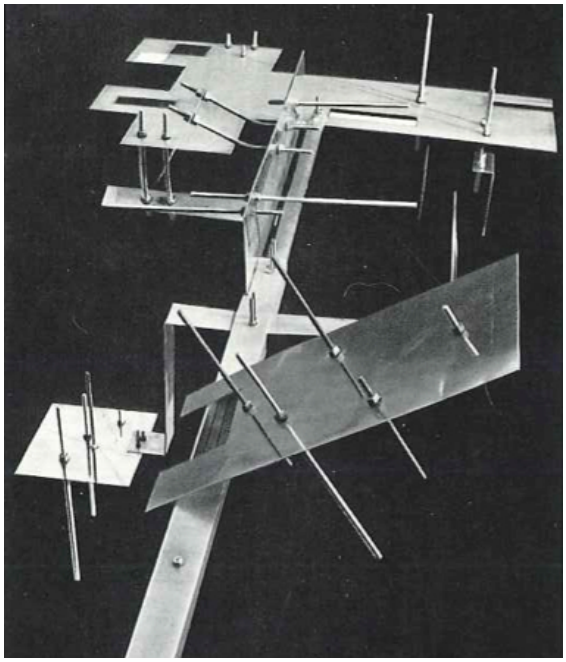

Figure 3.1.2: *Spatiodynamique 3 — Spatiodynamic 3 (Schöffer, 1963, p. 22 b).*

38 The Viennese Kineticists were foremost Hungarian artists, including Victor Vasarely and Lásló Maholy-Nagy, in exile from an oppressive cultural regime. Schöffer, having attended the University of Applied Arts in Budapest, was aware of his country's history of emigrating artists encouraging him to emigrate to Paris in 1936 (Bajkay, 2005, p. 46; Wiebel, 2005, pp. 46–56; *ibid*, pp. 57–70).

The parallel emergence of systems studies and Schöffer's pre-cybernetic artworks can be viewed as a synchronistic occurrence as can the development of cybernetics and systems theory. While retrospectively it may seem that Schöffer's pre-cybernetic sculptural artworks are informed by systems studies and, because of their coincidental timing with the emergence of cybernetics are groundbreaking within that context, they must not be considered as such but instead as part of ongoing artistic exploration in the modern era. The artist's practice developed out of an awareness of earlier twentieth-century artistic exploration. Similarly, it should be noted that early systems studies, specifically first-order cybernetics, can be viewed as being informed by structuralism which had discussed structures and the relations/affect their parts have on them almost fifty years before cybernetics.

Schöffer's pre-cybernetic artworks do, however, raise some notable points concerning the evolution of the artist's practice and how he would later adopt systems studies as part of his conceptual framework. As mentioned above, the artist was already part of a wider field of modern artistic exploration. Art historian Frank Popper, for example, cites Schöffer's artworks as contributing to a “luminous trend” (Popper, 2007, p. 12) of kinetic art. Schöffer's pre-cybernetic artworks were already touching on ideas of relationship and affect without knowledge of systems studies. With knowledge of cybernetics, he was able to support and rationalise his artistic enquiry with scientific theory and establish potential cooperation between art and science (Németh, 2005, p. 100). For Schöffer, systems studies was favourable in its timing and provided an opportunity to further his artistic practice. More importantly, however, the synchronistic occurrence of systems concepts within Schöffer's pre-cybernetic artworks and the emergence of cybernetics supports the suggestion that systems studies was itself the result of synchronism amongst diverse fields (Wiener, 1949, pp. 8–39). Just as Schöffer's practice contributed to ongoing artistic practice in the modern era, each occurrence in each field was conceived as a contribution to ongoing developments in their field. The success of systems studies as a “common terminology” (*ibid*, p. 19) for all, however, demonstrated that there was a growing awareness of research between fields, which was being successfully shared and disseminated.

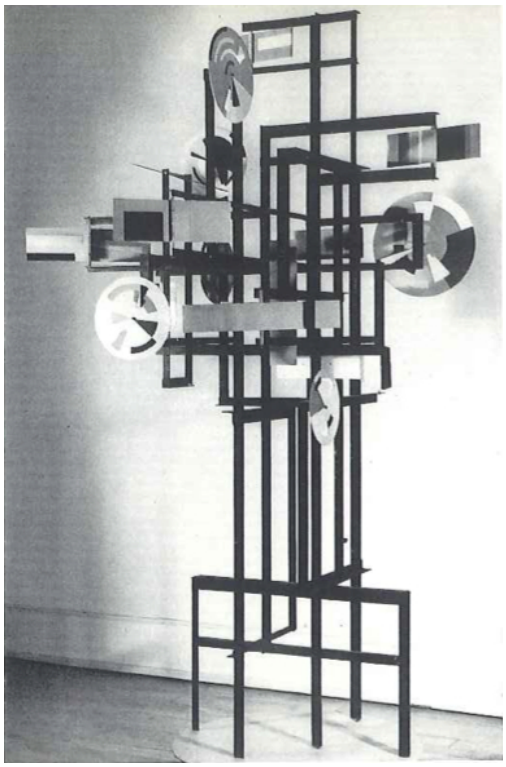

Figure 3.1.3: *CYSP 0 (Schöffer, 1963, p. 50 c).*

Figure 3.1.4: *CYSP 1 (Schöffer, 1956).*

Created in 1956, Schöffer's first designated cybernetic artworks demonstrating an awareness of systems studies are the *CYSP* series; *CYSP 0* (1963, p. 50 c) (Fig. 3.1.3), *CYSP 1* (1956) (Fig. 3.1.4) and *CYSP 2* (1963, p. 60 c). An amalgamation of the word cybernetic and his term Spatiodynamic (Shanken, 2002, pp. 6–7), Schöffer intended the artworks to extend his *Spatiodynamic* series (OLATS, 1997 a). However, the artworks also clearly signal his new-found knowledge of cybernetics, his enthusiasm to incorporate it into practice and, by placing the initials first in the acronym, foreground it. *CYSP 1* is widely considered the first sculpture of cybernetic art, and this is in no small way due to Schöffer's declaration that it was such,[39] which was then upheld within subsequent art history texts. Its predecessor, *CYSP 0*, had articulated movement. However, *CYSP 1* also had autonomy of movement in all directions (Habasque, 1963. p. 12; Schöffer, 1963, p. 50 c). *CYSP 1* incorporated photo-electric cells and a microphone enabling it to sense colour, light and sound

39 Schöffer stated that *CYSP 1* is "une *sculpture cybernétique* (la première qui existe au monde)" — a cybernetic sculpture (the first in the world) (1956, pp. 37–39, italics in original, my translation), in the French monthly magazine, *Tout Savoir*. This statement is also repeated in numerous other publications including his monograph (Schöffer, 1963, p. 50 c).

intensity (Schöffer, 1963, p. 50 c) using its electronic brain to behave in response to them. It could be:

> "excited by the color blue, which means that it moves forward, retreats or makes a quick turn, and makes its plates turn fast; it becomes calm with red, but at the same time it is excited by silence and calmed by noise. It is also excited in the dark and becomes calm in intense light. Inasmuch as these phenomena are constantly variable, the reactions are likewise ever changing and unpredictable, which endows the mechanism with an almost organic life and sensitivity" (*ibid*).

CYSP 1 marked a turning point in the artist's oeuvre. Unlike previous artworks, the combination of sensors and ability to act under its own locomotion meant the artwork was all at once an interactive kinetic sculpture and a dancer, adaptable to theatre, exhibition and film contexts (Schöffer, 1963, p. 50 c). Schöffer considered *CYSP 1* a "living counterpoint" to the human body and an "artificial being" (*ibid*) in its own right. It could be altered or adapted dependent on conditions, and as such, it was radically different to artworks from prior to the modern era, which were closed systems as they could not be altered. *CYSP 1* would in a sense live and create in collaboration with and response to anyone present in the same space making it an open system.[40] Each presentation of the artwork was dependent on its behaviour making it unique and therefore comparable to performance art.

The artwork adhered closely to what would later become Schöffer's tenet, "le rôle de l'artiste n'est plus de créer une oeuvre, mais de créer la création" — The role of the artist is no longer to create a work of art but to create creation (Schöffer, 1970, p. 14, my translation). Not alone did Schöffer consider *CYSP 1* an open system, that is an artwork that continually changed through behaviour or creation with it, rather than an art object that was fixed in space and time but he also redefined the role of the artist

40 *CYSP 1* is not the first artwork by an artist to demonstrate characteristics that make it an open system. As already noted, "process, kinetics, interactivity, audience-participation, duration, and environment" (Shanken, 2002, p. 6) had been employed numerous times in the twentieth century. It is instead the first artwork to be conceived by an artist with a clear awareness and understanding of the concept of an open system as defined by cybernetics.

as a creator of a system and his audience as its active users.[41] When combined, user and artwork, both systems in their own right, each became parts or nodes and so subsystems of a suprasystem (see chapter 2.3). *CYSP 1* was also unique in how it related to its users making it distinct from later artworks by Schöffer. Edward A. Shanken states that the *CYSP* series were:

> "robot-like sculptures … [that] reacted to the presence of observers, recalling the uncertainty principle and second-order cybernetics, both of which state that the act of observing alters the phenomena that is being observed" (Shanken, 2009, p. 62).

Following discussion in chapter 2.3 *CYSP 1*, similar to any artwork observed, modern or pre-modern, can be considered a possible node in a system that affects the observer and thereby changes the artwork for them. However, behaviour on an artwork that only occurs as a result of observation seems implausible as behaviour defined by systems studies. It lacks the potential for ongoing behaviour and change experienced and shared between all observers, in particular, if the artwork is pre-modern and by implication typically a closed system.

In *CYSP 1* there is more than change through observation, there is ongoing behaviour that affects its users and changes the artwork. This behaviour is most evident in dance performances where the artwork was employed.[42] The performances without a doubt demonstrate an ongoing bi-directional behaviour between the artwork as a dancing system and the human dancer, a user of the dancing system, which is causally initiated (Pask, 1975, p. 13–19) by the dancer to choreograph movements. As a "robot-like sculpture" (Shanken, 2009, p. 62) *CYSP 1* is, like the human dancer, a figure within a space. Both artwork and dancer relate to each other as figures of comparative size and type of movement, but they also relate to each other as nodes within the system created by their ongoing interaction.

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41 User is a term associated with computing and is frequently used in the discussion of new media art. Since cybernetic art is frequently considered to be a predecessor of new media art technologically (see the writings of Edward A. Shanken) and the term has already been introduced in chapter 2.3 it will be used from this point onwards in relation to human-machine paradigms of interaction. For a full definition of user, please refer to the glossary.

42 *CYSP 1* performed in 1956 at the Sarah-Bernhardt Theatre (now the Théâtre de la Ville, Paris) during a *Poetry Night* organised by Andre Parinaud and with Maurice Béjart's ballet company at Le Corbusier's Cité Radieuse as part of the *First Avant-Garde Festival* in Marseille (OLATS, 1997 b; Shanken, 2009, p. 62).

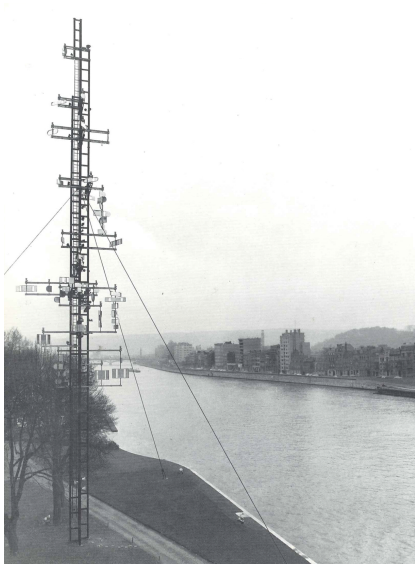

Figure 3.1.5: *Tour Spatiodynamique — Spatiodynamic Tower (Joray, 1963, p. 106).*

Figure 3.1.6: *Nicolas Schöffer performing Chronos 2 with the Musiscope (Joray, 1963, p. 100).*

Later artworks were equally equipped with the ability to move in a variety of ways. For example, the *Tour Spatiodynamique* — Spatiodynamic Tower (Joray, 1963, p. 106) (Fig. 3.1.5) had arrays of sensors to respond to anyone present or to conditions in a space while *Luminoscope 1* (*ibid*, pp. 86–89) and the Musiscope employed in *Chronos 2* (*ibid*, p. 100) (Fig. 3.1.6) had purpose-built interfaces in order for users to interact with them. None of these artworks, however, were “robot-like” (Shanken, 2009, p. 62) or moved comparable to a human figure within a space. Instead, they towered over their users transforming the surrounding space or immersed their users within their space. They continued ideas in the artists earlier Spatiodynamic period however rather than treat “space in a plastic work” (Schöffer, 1963, p. 20 a), they treated a plastic artwork as space altering or forming; essentially they became the space itself. The one-to-one interaction present in *CYSP 1* was replaced with either group interaction or the artist's interaction. In group interaction ongoing bi-directional behaviour was complicated by the artwork's requirement to respond to a group rather than an individual, limiting user's behaviour with the artwork and reverting them to a more observer-like state. In artist interaction, bi-directional behaviour is reserved for the artist alone. He became centrally placed as a performer of his artwork while others are reverted to a spectator state with only the possibility of being affected by

the artwork and not affecting it.

In many ways, the art of Roy Ascott[43] is both complementary and contrasting to the art of Nicolas Schöffer. Similar to Schöffer, Ascott was creating a type of artwork, the *Change Paintings*[44] (1963, no pagination) (Fig. 3.1.7), that were kinetic constructions and displayed many of the characteristics of cybernetics before the artist became aware of cybernetics. According to Ascott he first learned of cybernetics in 1961 when he read texts by Wiener, George and Ashby (Shanken, 2002, p. 3), however, Ascott had visited Schöffer's Paris studio in 1957 whom he cited as an influence (Shanken, 2003, p. 49). Created between 1959 and 1961 the *Change Paintings*, conceived of at the time from a painting perspective but later referred to as kinetic relief sculptures by the artist (Mason, 2008, p. 54), consisted of constructed boxes with a routed front holding separate overlapping translucent panels. Each panel had marks or images and could be slid by the user (Ascott, 2008, p. 11). It is no coincidence that Shanken compares these artworks directly with Schöffer's Spatiodynamic artworks stating that similarly by:

> "engaging the viewer's active physical and mental participation in determining the composition and meaning of the work. The viewer became an integral part of the artwork, which Ascott conceived of as a cybernetic system, consisting of feedback links between artist, object, and audience" (Shanken, 2003, p. 30).

Ascott refers to several factors as initiating these artworks in the catalogue of his 1963 exhibition *Diagram Boxes and Analogue Structures*, including:

> "the need to find patterns of connections in events and sets of objects; the need to make ideas solid (working in wood, etc.) but interfusable (transparent panels, hinged sections), an awareness of change as fundamental to our experience of reality; the intention to make movement

43 Roy Ascott (b. 1934), English artist.

44 These are also referred to as "'chance-paintings' or 'kinetic constructions'" by Frank Popper (2007, p. 77). Chance alludes to the compositions, the output, that may be arrived at by the user moving the paintings parts while kinetic refers to the action, the behaviour, caused as a result of the user's input.

a subtle but essential part of an artifact” (no pagination).

Once fully versed in cybernetics it provided Ascott with a framework with which he could begin to group, research and articulate these concerns. Schöffer's starting point was 'real' movement (Habasque, 1963. p. 11) and he developed several series of artworks tackling space, light and time. Ascott instead explored how all of these could essentially be summarised as change in the artwork. How “inculcating creativity or eliciting creative behaviour from the spectator” (Popper, 2007, p. 77), simultaneously changing the role of both the artist and their audience, could be employed as a means to initiating that change.

Figure 3.1.7: *Change Painting (syncretica Archive, 2009 a).*

Change was important in Schöffer's art. As discussed above when *CYSP 1* was employed in dance performances there is without a doubt bi-directional behaviour, that is both sculpture and dancer are affecting each other and as a result changing in response. However, *CYSP 1* was distinct in how it redefined the role of the artist and foregrounded users in certain scenarios, an occurrence that did not occur frequently or as clearly in his later artworks. For Schöffer *CYSP 1*, the sculpture as an object was the art. It was first and foremost change in the artwork, its movement or reconfiguration, and the change that it could create in society that was important. This change, in turn, changed the role of the artist to a creator of art as a system for behaviour, which he wrote about on numerous occasions (Schöffer, 1970) and adhered to throughout his career. However, his research and treatment of the

change in the role of the audience from observer to user was inconsistent in his art. Moving throughout his career from artworks that employed one-to-one interaction and foregrounded ongoing bi-directional behaviour to artworks that responded to groups or the artist and in a sense limited user's behaviour meant his art seemed disjointed and perhaps unresolved.

For Ascott, however, change was “recognition that art was located in an *interactive system* rather than residing in a material object” (Shanken, 2002, p. 3, italics in original). Materiality was not a prerequisite for creating art, art could be behaviour itself, but the user was key to initiating that behaviour. While Schöffer's artworks were both 'real' and concrete, that is material systems (François, 1997, p. 584) that were interacted with, Ascott's art was striving to be a system of behaviour interacted within. The *Change Paintings* were a first step towards demonstrating this and ultimately would shift Ascott away from his identification as a painter. According to Ascott, the paintings were not themselves the artworks. They and their users were nodes within a system that was defined as an artwork, essentially what has been discussed above as Backlund's suprasystem (see chapter 2.3).

Art considered as a system of behaviour and the concept of interaction had both already been employed within the modern era. However, Ascott's consideration of these as his concept of change in art was more sophisticated as a result of being informed by cybernetics. The artist not alone proposed ongoing behaviour as “making explicit a bi-directional model of aesthetic information exchange” (Mason, 2008, p. 65) between the kinetic constructions and user but also, through the constructions as a medium, suggested a dialogic behaviour between artist and user. Two factors can be considered as contributing to this. Firstly, the artist's relationship between his practice and pedagogy. Both informed each other. However, it was a cybernetic feedback model that the artist folded into education contexts, creating an interactive process between educator and student that broke from conventional art schools uni-directional model of “master and apprentice” (Mason, 2008, p. 58), which enabled him to conceive of his practice as didactic (Ascott, 1964, p. 99). Secondly, the artist's friendship with Gordon Pask who spent time explaining cybernetics to Ascott, delivered a lecture to his students on the Groundcourse at Ealing College of Art (Ascott, 2008, pp. 13–14; Mason, 2008, pp. 58–61) and would in the 1970s

establish a dialectic framework focused on human learning systems called conversation theory.

However, the existence of kinetic constructions as artist created objects within Ascott's art, the very materiality the artist claims was not necessary for there to be art, undermines the strength of his argument. The *Change Paintings* are after all paintings, visual representations on the surface of objects. They cannot break free of their materiality and the association of art as a practice of creating aesthetic objects. This association, which had its basis in Immanuel Kant's *Critique of the Power of Judgement* (2002), became embedded in all art theory until the early twentieth century. Only since Marcel Duchamp was art beginning to break free to successfully develop process-based strategies that dematerialized art as object (Lippard, 2001)[45] and in the 1960s became known as conceptual art.

In the late 1960s, parallel to the development of conceptual art, Ascott discusses the paradox of being "*progressively* process-oriented, but [continuing] to produce art objects" (1968, p. 105, italics in original) in a paper titled 'The Cybernetic Stance: My Process and Purpose' (*ibid*). He explains his practice methodology as operating on two distinct but related scales. A "social scale" (Ascott, 1968, p. 105), a theoretical framework he calls the Cybernetic Art Matrix (CAM) purposed as affecting society as a whole that was manifested largely through his teaching and writing, and an "intimate scale" (*ibid*, p. 105), which was employed within his practice of creating kinetic constructions that were generally interacted with by one user at a time. Regardless of whether the artist was conceiving of theory or producing art objects he claimed both were triggers for behaviour:

> "They contain nothing but the possibility of future action; that is to say they exist only in so far as the spectator participates in their evolution by, on the one hand, interacting with other people within a complex social situation [within the CAM], and on the other hand by conducting a private interior dialogue [within the system created between kinetic construction and user]" (*ibid*).

45 Lucy Lippard's term dematerialization is employed using her original orthography throughout this research.

By treating theory and practice as having the same purpose but employed within different contexts, Ascott shifts the focus away from materiality. It is irrelevant the artist creates objects or theory as part of his practice because his art is not per se a concrete system, that is material or object reliant, it is instead a 'real' system (Thellefsen and Thellefsen, n.d.). 'Real' is understood within Ascott's framework as anything that actually materially or psychically, that is cognitively, affects something. It is “a layering of *psi*bernetics over cybernetics” (Ascott, 2008, p. 15, italics in original) and as such distinctions between materiality and immateriality are not a concern. So there is, in fact, no contradiction in the artist's practice of creating objects as they are triggers to initiate the process-orientated or behavioural art; in the case of the *Change Paintings*, they are triggers to elicit interaction from a user.

Ascott separates into four parts the forms of behaviour that his art can be:

1. when it is the “behaviour of the artist” (Ascott, 1968, p. 106) that is considered, that is, the performative action by an artist, the art is a *behavioural ritual*;

2. when it is the “behaviour of the spectator” (*ibid*, p. 107) that is considered, the art is a *behavioural trigger*;

3. when it is the “behaviour of the objects” (*ibid*) created by the artist that is considered, art is a *behavioural structure*;

4. and when it is consideration of subject matter in behaviour terms, art is a *behavioural analogue*.

In these, it would seem that there are potentially four sets of behaviour that can collide in Ascott's art. However, he adds that “the art work or event is a matrix between two sets of behaviour” (*ibid*), that is the artist's and the user's behaviour. The forms of behaviour he defines create some conceptual confusion as to what precisely is defined by Ascott as the art. When considered together they seem contradictory. They claim the artwork is *behaviour itself* of which there are four types and yet the artwork is *between two behaviours*, the artists and the users. If an artist created object such as the *Change Paintings* are not the art per se but triggers to elicit interaction from a user, then it must be the combination of artist, trigger and

user that is a system of behaviour and that system of behaviour is the art. With the addition of subject matter, which presumably all artworks have, this aligns with Ascott's four defined sets of behaviour yet why does Ascott single out the artist's and user's behaviour?

The definition of artwork *as behaviour* places all four of the artists defined behaviours on equal footing. Artwork as *between two behaviours* of artist and user, however, devalues the behaviour of the object or the trigger and subject matter within any behavioural system created. Additionally, it suggests that an artwork may be created as a result of negotiation between artist and user significantly changing the conventional role of the artist. The conceptual confusion created by these statements seems never to be directly addressed by Ascott. However, the statement that an artwork is *between two behaviours* is repeatedly made in writings from the 1960s through to the 1980s with minor variation (Ascott, 1964, pp. 99–100; Ascott, 1966–67, p. 128; Ascott, 1980, p. 51). This period overlaps with the artist's move from kinetic constructions to employing computers to make telematic art, a dramatic shift from objects to digital that demonstrates the diversity of what a trigger could be. Additionally, Ascott upholds the importance of the user and states that “the viewer/observer must be a participator and is of operational importance in the total behavior of the system” (Ascott, 1980, p. 51). As such, it challenges what Ascott terms as “the Renaissance paradigm of the artist standing apart from the world and depicting it and the observer standing outside of the artwork and receiving this depiction” (1988, p. 215 a). He supports his argument by citing physicists John Wheeler and Wojciech Zurek and their identification in the sciences that “one has to cross out that old word 'observer' and put in its place 'participator' [because] the universe is a participatory universe” (Wheeler and Zurek 1983, p. 6).

The implications of Ascott's art as *between behaviours* of artist and user is radical in that it redefines an artwork as a system. However, as mentioned above, it also suggests that an artwork may be the result of negotiation between artist and user and this significantly changes the conventional role of the artist. It seems difficult to understand from an artist's perspective why Ascott would want to change the role of the artist to this extent; the suggestion being that the artist might be perceived to make a lessened or even unimportant contribution in the creation of the artwork. In

telematic contexts Ascott asserts that this type of art does not, however, suggest "'the death of the author' … some kind of anonymous, totalising collectivity of minds, endlessly recycling data, in which individual visions and aspirations are subsumed and diminished" (1988, p. 231 b). Instead, it offers for both artist and user:

> "amplification of individual thought and imagination, by linking up minds with minds, person to person, and so widening our creative frames of reference, opening up new horizons and contexts of work, and diversifying the connections between aspects of different cultures and individual realities" (*ibid*).

Regardless of what is arguably lost or gained, the concept of art as *between behaviours* of artist and user does two things. Firstly, it positions artist and user as potentially having equal input within an artwork. While this changes the paradigm of conventional art, it is questionable whether it changes it for the better. When an artwork is created according to Ascott's concept of system-based art why is the artist still credited as the creator? If this is as a result of the artist conceiving of the initial idea then surely there is validity in a distinction between artist and user. While the contemporary art attendee may indeed want active, participative roles as Ascott argues (1968, p. 106), that is to be a user, is it in effect the same as stating that now everyone is an artist?[46] In other writings, Ascott states that the artist has a social and moral responsibility to understand changes in society to fully understand the didactic and social role of the art created (1964, p. 98). Does this responsibility equally apply to a user and can it be stated with certitude that users want this responsibility? Secondly, the concept of art as *between behaviours* of artist and user limits the scope of what can be considered as system-based art. It would be equated, and therefore limited, to only user participative art ruling out any non-user type of system-system interaction.

The positioning of Ascott's art as *between behaviours* of artist and user can conceivably be viewed as a negative side effect of the artist too forcefully applying pedagogical dialogic models, that is two parties learning through a medium, to his

46 This statement is most famously associated with Joseph Beuys whose intent was not to position everyone as an artist producing art but to underline that everyone has creative potential.

practice and effectively making the art a didactic medium. There is evidence to suggest that this may be the case as the artist would in the 1970s cease to create wall-mounted kinetic constructions and instead favour the use of a horizontal plane, primarily tables, as a “dialectical surface” (Ascott, 1975, p. 170) (Fig. 3.1.8). During this period, however, Ascott was searching for further means of instigating behaviour. Shanken notes that “the initial formal concerns of conceptual art were being formulated under the rhetoric of 'dematerialization,' [while] Ascott was considering how the ethereal medium of electronic telecommunications could facilitate interactive and interdisciplinary exchanges” (Shanken, 2003, p. 4). This would ultimately be employed in his artworks from 1980 onwards such as *Terminal Art* (*ibid*, p. 69) and *La Plissure du Texte* — The Folding of Text (Adrian, n.d.), a “planetary fairytale” (Ascott, 1990, p. 240) performed across eleven sites (Fig. 3.1.9).

Figure 3.1.8: *Users interact with Plastic Transactions (syncretica Archive, 2009 b), an example of a table-based artwork produced by Ascott in the 1970s.*

By comparing and contrasting the art of Schöffer and Ascott, there are several points that clarify why systems studies were co-opted by contemporary art. Both artists engaged with cybernetics as a means to rationalise process and behaviour within their artworks thereby moving their practice and by proxy, contemporary practice, forward. In Schöffer's practice, cybernetics provided a conceptual framework that

retrospectively grouped and rationalised his artistic concerns as well as a number of technological solutions to achieve 'real' movement in sculpture. These included mechanical locomotion, electronics and varying degrees or types of user interaction such as individual, collective or artist as performer. He created artworks that were interactive thereby changing the role of a physically passive observer to active user. However, the artworks predominantly remained object-based, and distinctions between artist and user were maintained. For Ascott cybernetics also provided a conceptual framework within which his practice could function however unlike Schöffer the artist did not employ technological solutions associated with it. Instead, he altered the purpose of what he was creating, renaming artist created objects as triggers and the system that emerges from their use as the art. Over time, he would dematerialize the object completely (Lippard, 2001), as if proof that a trigger was not object-dependant, by adopting 'soft' or digital technologies as a means to this end.

Figure 3.1.9: *La Plissure du Texte. Clockwise from top left: Roy Ascott in Paris, Students of the Ontario College of Art in Toronto, Tom Klinkowstein and Robert Adrian X in San Francisco and Zelko Wiener and colleagues in Vienna (Adrian, n.d.).*

Schöffer's art was *art object as system*, that is a discrete object that accepted

interaction as input and regulated its behaviour to generate output in response. Users behaved *with the system* yet while an artwork such as *CYSP 1* changed, that is it varied through a finite number of possible movements, it was not fundamentally altered as a result of input. As such, Schöffer's art can be considered as primarily characteristic of first-order cybernetics regardless of whether it seems to have some qualities of second-order cybernetics (Shanken, 2009, p. 62). Ascott's art, however, was *system as art*, consistent with second-order cybernetic principles as the user interacted *within the system* changing it and so altering the art itself. Nam June Paik's statement on cybernetic art provides some insight when comparing Schöffer's and Ascott's art. He states “Cybernated art is very important, but art for cybernated life is more important, and the latter need not be cybernated” (1966, p. 229). Viewed through Paik's terminology Schöffer's art was cybernated art. It was art employing systems to make an artwork as object variable and thereby questioned conventional concepts of the art form as a fixed object in space and time, one of the principal aims of what I have termed as the grand-project of art in the modern era. Ascott's art, however, was art for cybernated life, art that was itself a system. Consequently, Ascott proposed a future form for art that not alone suggested a way to change how artworks were considered as objects by dematerialising the object in art but in the process also became media independent.

3.2 Systems art: an esthetic of systems

In the 1950s and early 1960s numerous artists, in addition to Schöffer and Ascott, started to systematise art. This section explores the systematisation of art, termed systems art, as the second of the selected art developments considered a key part of the history of networked art. A selection of various international artists and their practice are first briefly introduced as a survey of the numerous approaches to systemising art that were occurring at this time. Next is an exploration of systems art through the writing of Jack Burnham, followed by two case studies of the artists Hans Haacke, who was closely associated with Jack Burnham, and Stephen Willats.

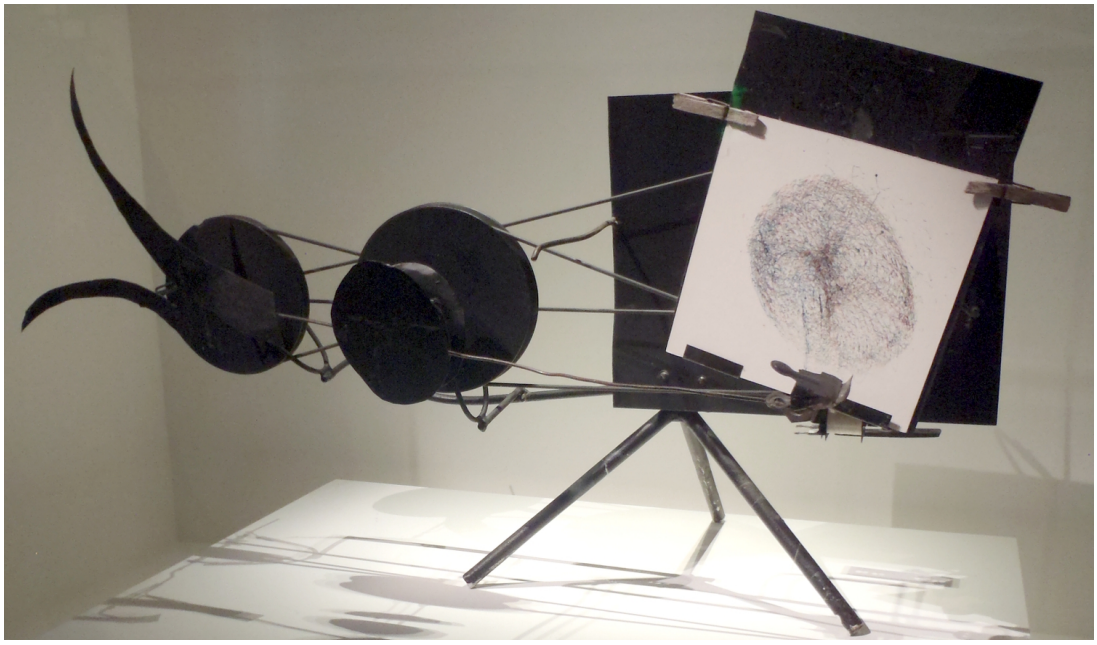

Figure 3.2.1: *Métamatic no. 6 (Tinguely, 1959).*

Strategies developed by artists to systematise art included combining various media and technologies to create artworks; conducting their practice through formalised frameworks, rules and processes; creating artist-led initiatives and organising their exhibitions, events and publications. Jean Tinguely for example constructed mechanical systems called *Métamatics*, such as *Métamatic no. 6* (Fig. 3.2.1), which could generate paintings mimicking those made by the Abstract Expressionists (The Art Story, 2018). By 1960 he was creating systems such as *Homage to New York*

(Fig. 3.2.2) that destroyed themselves in performances (Media Art Net, n.d.). Similar to Schöffer's and Ascott's art, Tinguely's art demonstrated the influence of cybernetics on art through his use of systems. However, the artworks also satirically commented on industrialised society and how its culture, in particular, avant-garde contemporary art, was becoming canonised by institutions[47] and removed from the society it should represent.

German artists Heinz Mack and Otto Piene founded the artist's group ZERO in 1958 (ZERO, n.d.). ZERO meant from nothing and was intended to indicate a desire to liberate contemporary art from constraints of institution and state (*ibid*). The group systematised their art by initiating temporary exhibitions in their studios, events in public spaces and rapidly creating a network of artists, including Jean Tinguely, and curators across Europe. This network disseminated their ideas as art through manifestos as well as founding variations of the group such as Nul in Holland (Siegal, 2013). Their art world was effectively a system separate from the institutional system and which traversed nationality. ZERO artists were multi-media artists in the original sense of the term.[48] They frequently employed systematic processes in their art by working with technological systems such as those used in the fabrication of industrial materials, natural systems such as fire, water, light and movement (Galloway, 2006). In some cases, they employed systems as subject matter such as in the oeuvre of Roman Opalka, *1965/1*–∞ (The Metropolitan Museum of Art, 2018).[49]

In New York, Allan Kaprow, originally a painter, started to organise experimental performance events called *Happenings* in 1957 (1961, pp. 15–26) (Fig. 3.2.3). Similar to ZERO events, these occurred outside of the context of the art gallery and theatre venues of the time to explore new forms of art in everyday environments

47 Canonisation by institutions is demonstrated by Clement Greenberg's 'patronage' of certain American artists in the mid-1950s to push his belief that the best avant-garde art was being created in America and that it all conformed to a particular style identified as Abstract Expressionism.

48 As explained by Randall Packer multi-media, as it was originally spelt, has been used since at least the 1960s to describe “various manifestations of avant-garde theater, mixed-media, performance art, installation, and other uncategorizable forms involving video, film, and electronic music”. It can arguably be traced back to nineteenth-century composer Richard Wagner (Packer, 2013). It should be considered the origin of multimedia, as one word, which is generally accepted as computer-based media combined on a computer to be experienced through the computer (Rockwell and Mactavish, 2004).

49 *1965/1*–∞ is Roman Opalka's life's work. It includes a series of paintings, containing counting from one to a number that would be decided by his death, self-portraits and sound recordings. In this manner, his life and time became a system to be explored and documented through numbers.

(Kaprow, 1961, p. 85). As a result of their exploratory nature, the *Happenings* were often very different from each other. Some were loosely scripted and had an overall purpose, perhaps a narrative or scenario, while others had “no structured beginning, middle, or end. Their form is open-ended and fluid” (ibid). Each *Happening*, however, provided observers with a limited possibility of interaction. In a performance context, this was a strategy to break down the fourth wall, that is the imaginary wall between audience and performers through which audience can see performers but performers do not acknowledge the audience. Equally important in an art context, however, was the removal of Psychical Distance (Bullough, 1912),[50] the literal and cognitive, temporal and spatial distance, between observer and artwork. In an interview in the late 1960s, Kaprow refers to the structure of *Happenings* as a program, the term he employs “to call a scenario” (Schechner, 1995, p. 186), and discusses how this redefines control. He suggests that the *Happening* as art, removed from the defined space of “the canvas, the gallery, the stage” (*ibid*, p. 88) and merged with life, cannot be scripted as it is in conventional theatre.[51] Instead, a systems way of thinking about the *Happening* is required to allow openness for the observer to interact, the performer to improvise and the performance to evolve.

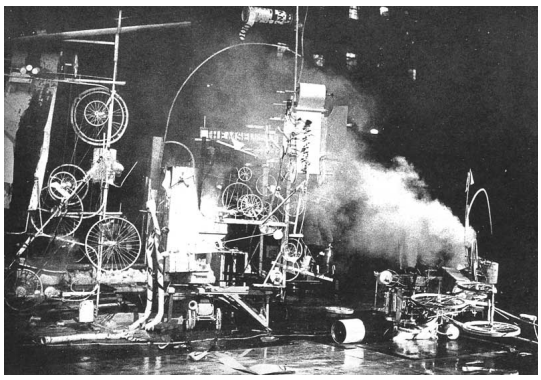

Figure 3.2.2: *Homage to New York event (Media Art Net, n.d.).*

Figure 3.2.3: *A Happening titled A Spring Happening (Kaprow, 1961, p. 17).*

50 Bullough capitalises his term Psychical Distance, and this is retained in this research.

51 The aspiration to merge art with life is a reoccurring concept in artistic discussion since at least the start of the twentieth-century (Bishop, 2006 b). In the late 1950s, this was coined as art and life by Kaprow in an essay titled 'The Legacy of Jackson Pollock' (1958) (Beaven, 2012) and also became heavily associated with the work of John Cage.

In Paris, the Groupe de Recherche d'Art Visuel — Visual Art Research Group (Popper, 1968, p. 103) also contributed to the activation of the observer but in a very different way to Kaprow's *Happenings*. Their interest was primarily in the relationship or system of artist, observer and artwork (*ibid*). Their art, historically classified as optical art, was activated by the displacement of the observer and gave the illusion of movement. Through this combination of image, movement and time they created what they described as a "new visual situation" where the observer "was no longer able to maintain the distant relationship with the work which had previously been the rule. A virtual movement had been set up" (*ibid*).

In the examples discussed above, including Schöffer's light and sound artworks and Ascott's application of a theory of systems to art and pedagogy (see chapter 3.1), three points should be noted in the influence systems studies had on art at this time. Firstly, the wide range of artistic practices, which included sculpture, visual art, kinetic art, optical art and performance, that were employing or being influenced by systems studies. Secondly, the variety of concepts, methodologies, processes and philosophies from the fields of science and technology that were being adopted to achieve this. Thirdly, how systems studies was being applied in a diverse number of ways towards the re-conception of practice and its support mechanisms such as exhibitions, curating, critical writing and pedagogy.

In *Art as Inquiry* (1997) Marga Bijvoet discusses the appearance of scientific and technological terminology within art discourse throughout the 1960s. She refers to Marshall McLuhan's influence as specifically defining and contributing "words like structure, pattern, organization, indeterminacy, interrelatedness" while cybernetics supplies "words like feedback, information, parameter, software, hardware, entropy" (*ibid*, p. 72). Bijvoet suggests that artists of this generation who were predisposed to experimentation and exploration in their practice and who often employed scientific and technological means to that end were sufficiently well-informed to incorporate their theoretical discussion in their statements and writings (*ibid*, p. 71).[52] With all of these factors considered, there is no doubt that artist's use and application of systems to art can be considered to be at least partially responsible for the adoption

52 Bijvoet refers specifically to the statements and writings of Robert Smithson, Nam June Paik and Paul Ryan as examples.

of science and technology in art.

The application of systems to art should not, however, be considered only as an outcome of experimentation and exploration facilitated by science and technology. Of equal importance was how systems studies was viewed as a means of engaging with what I have termed as the grand-project of questioning conventional concepts of the art form in the modern era; specifically the role of the artist, art as object, the means of its creation and the role of the observer (see chapter 3.1). In addressing these, systems studies could be considered as a way to reclaim art from institutions and reintegrate it into life.[53] The foremost exponent of applying thinking from systems studies to art was Jack Burnham,[54] an artist that is now predominately known as an art writer, theorist, historian and curator. Burnham developed a concept of systems art that integrated systems studies, which he named systems esthetics[55] in an *Artforum* article in 1968.

In his writing Burnham's concept of systems esthetics emerges from a sculptural background and his starting point is “the cultural obsession with the art object” (1975, p. 369); referring to the practice of artists shaping materials and to audiences' expectations of an artwork as object. He refers to numerous artists working with a conceptual basis of a systems esthetic including Hans Haacke, Dan Flavin, Carl Andre, Robert Morris (Burnham, 1974), Robert Smithson, Dennis Oppenheim (Burnham, 1969) and Les Levine (Burnham, 1974). In the oeuvre of each artist, he identified how the object was either downgraded in importance through the use of commonplace or unaesthetic materials,[56] as opposed to the aesthetic materials employed in object-based fine art, or removed completely. Instead, the artworks of the artists he discusses foreground “an awareness of systems and the functional relationships between art objects” (Rampley, 2005) or between art and life. The practice of these artists is one of systems that enable reconfiguration of the roles of

53 In addition to Allan Kaprow several other artists and art movements at this time, including John Cage and Fluxus, employ the term art and life to summarise this sentiment.

54 Jack Burnham (b. 1931), American artist, art writer, theorist, historian and curator.

55 Burnham's original orthography has been retained.

56 Bijvoet argues that the use of “cheap, non-precious daily-life and junk objects, natural materials like dirt or plants, and temporary materials subject to decay” (1997, p. 1) was characteristic of some artists practice at this time who attempted to break or cross boundaries in art. Examples can be found not just in the oeuvre of artists identified as systems artists but also within developments and movements such as conceptual art, Fluxus, Arte Povera and process art.

the artist and observer. The artist becomes a conceptual rather than craft-based role, and the observer potentially becomes participative in the artwork echoing the shift away from the use of the term observer in science that was occurring at the time.

According to systems esthetics systems art was the antithesis of formalism and as such can be understood as post-formalist (Rampley, 2005). Systems art was closely associated with conceptual art[57] while formalism valued form and style above concept thereby advocated materiality and medium specificity through which to achieve it. Systems esthetics intentionally set about supplanting formalism, most commonly associated with Clement Greenberg. In his essay 'Art and Objecthood' (1967) Michael Fried discusses the conflict that was occurring in modern art at the time as a result of the grand-project (see chapter 3.1), in particular, questioning art as object. Fried employs the contrast between formalist and minimalist solutions as an example. He describes formalism's part-by-part accumulation of media to create a composed whole thereby establishing relationships such as thematic, visual and textural within the artwork. Minimalism's artworks were instead composed as a whole, contained no relationships but induced the experience of a situation between observer and artwork (*ibid*). Minimalists, or literalists according to Fried, attempted to create artworks that were neither paintings or sculptures and relied on a theatrical quality for their experience in the moment (*ibid*). This view was indicative of the philosophical thinking within art at the time. It provided a backdrop to the examples surveyed in the introduction to this section as well as the emergence of all conceptual art in the 1960s and prompted Burnham to set about engaging it with his concept of a systems art (Jones, 2012).

Systems art had similar theatrical qualities to minimalism, for example, it was time-based and could be reactive to external conditions such as an observer or the environment. Systems art, however, avoided minimalism's aim to create artwork that was a singular whole. It considered minimalism as a theory of art that attempted to be an ontological theory of objecthood by defining the artwork as a single indivisible

57 Burnham's curation of the exhibition *Software* (Bijvoet, 1997, p. 60) at the Jewish Museum in New York was criticised for selecting too many conceptual artists. Many had never before worked with communication technologies (*ibid*) and as a result, Burnham was accused of an agenda that positioned systems art as fundamentally conceptual.

element only identifiable as art and separate from the rest of objecthood. Not only was this an impossibility, as any material or media employed in the artwork is itself a collection of matter and/or bundle of properties,[58] but it also directly opposed systems theory's fundamental basis of the relationship between parts and wholes. Systems art also considered that formalism's aim "that it defeat or suspend its own objecthood" (Fried, 1967, p. 125), that is its materiality, through its use of form and style within the medium employed was unnecessary. While minimalism redefined the object within and specifically for art, formalism ignored the object completely. As such, systems art considered the aims of both minimalism and formalism as philosophically flawed.

By stating that art is not inherently an object that is created but instead a conceptually-based system, Burnham's concept of systems art could utilise the best of both formalism and minimalism. It was not a contradiction for a whole artwork to be composed of parts but a necessity from a systems art perspective. Those parts could have relationships within the artwork, as occurs within a closed system, but could also potentially have relationships with what is exterior to the artwork enabling it to be an open system. Additionally, the artwork required process for its system's relationships to occur. The removal of objecthood from art and its replacement with a conceptually-based system that was process driven, allowed systems art to align itself with systems thinking and developments in twentieth-century philosophy. These stated that reality consisted of processes and not material objects and was demonstrated in the writings of Alfred North Whitehead, Xavier Zubiri, Alexius Meinong and Charles Sanders Peirce (Museu d'Art Contemporani de Barcelona, 2013).

A formalist artwork's part-by-part accumulation as a form and style as well as thematic, visual and textural relationships it establishes may suggest a system within the artwork. However, it is purely one of representation and as such solely cognitive. The parts are unable to act on or change each other and are not subject to entropy so do not have the qualities of either closed or open systems. As a result of being

58 The reference to a *collection of matter or a bundle of properties* here refers to ontological theories of objecthood. These include substance theory and bundle theory, specifically reductionism of objects as bundles, whether that is to its material matter such as atoms, electrons, nucleons, quarks and so forth or the properties or attributes they have.

intrinsically linked to form through materials and style through media, I suggest therefore that formalist art is from a systems studies perspective a close approximation of an isolated system. It is not isolated in that it does not interact with the environment around it through input or output (see chapter 2.3) but has through its form and style a separation from its environment. This isolation is comparable to the separation that is created by Psychical Distance (Bullough, 1912). Additionally, being a system of representation that is solely cognitive aligns it with an isolated system's definition of being only possible, that is that it can only be described through systems of abstract language, which in this instance are visual. According to Fried, minimalist art is whole and has no parts (1967). As such, it has no possibility of being a system in itself. However, as a result of what Fried terms its theatrical qualities (*ibid*), it can be considered a part of a larger system of art or culture. Systems art can be both a system in and of itself and part of a system, such as art as a whole or the culture it exists within, in ether form and/or style.

In systems art, meaning does not arise from material form as it does in object-based art, but instead from the relationships created between its parts and/or systems it resides within. This idea defined Burnham's systems esthetics. For Burnham, a system is effectively both the conceptual basis of a new type of art and the artwork that is created. While systems esthetics may initially have emerged from the issue of art as object, which for Burnham was a sculptural perspective, there are additional effects of his thesis. In *Systems of Art: Art, History and Systems Theory* (2008), Francis Halsall elaborates on these. He links the conceptual basis of systems esthetics with Lucy Lippard's term dematerialization, a strategy of divorcing art from objecthood (*ibid*, p. 114). Halsall also suggests that the many forms that systems art takes and the combinations of media they use, the multi-media, are a result of Dick Higgins' Intermedia and/or Rosalind Krauss' post-medium condition (*ibid*). Artists no longer position their practice in relation to any one medium but instead employ a variety of media as required (*ibid*) and as such see their practice as occurring between media forms.

Hans Haacke's[59] oeuvre, more than any other artist's, demonstrated most thoroughly

59 Hans Haacke (b. 1936), German artist.

Burnham's theory of how artists who sought a solution to the objectification of art were employing systems. Haacke, in comparison with other artists Burnham cites as examples of systems art, developed a practice most rigorously and over the most extended period, steadily working through what can be considered levels of system complexity. In comparison to other practitioners, Haacke also displayed an attitudinal change in his approach to practice to the extent that Burnham called him an engineer (Burnham, 1967). Burnham would later comment that the ability "to think like an engineer [managing] input-output exchanges of materials, energy, and information" (Jones, 2012) was an essential characteristic for an artist of systems art. For Burnham, Haacke was a new type of artist, interdisciplinary in nature, working between art, science and technology. Haacke confirms that this is the case when he states that:

> "The artist's business requires his involvement with practically everything …. It would be bypassing the issue to say that the artist's business is how to work with this and that material … and that the rest should be left to other professions …. The total scope of information he receives everyday is of concern. An artist is not an isolated system … he has to continuously interact with the world around him" (Burnham, 1974, p. 30–33).

Associated with a variety of movements and developments throughout his long ongoing artistic career, including ZERO, kinetic art and conceptual art in the 1960s, Haacke has explored systems as a part of his art practice in three specific ways. Reflecting on his oeuvre of the 1960s Edward F. Fry states that the artist's art "moved from physical to biological to social systems" (Fry, 1972, p. 43) exploring:

1. *systems of natural forces or elements*;
2. *living plant or animal systems*;
3. and finally *human society as a system*.[60]

60 Haacke's consideration of systems continues in his current practice. In an interview concerning the unveiling of his work *Gift Horse* for the Fourth Plinth in Trafalgar Square, London he states the work "is an invitation to make connections, but I don't want to give directions about which connections are to be made" (Weaver, 2015). This statement suggests the ongoing influence of systems, in particular, open systems, and that the audience is through interpretation a part of the process of connecting the elements in the system.

These three categories, in a sense a taxonomy of all things natural,[61] demonstrated how systems could be extensively applied in the art of Haacke but can also be employed as categories for the consideration of art by other systems artists. The theme of *human society as a system* would later in Haacke's career become a central focus of his oeuvre. Specifically, he examined the art world as a system, how state and business patronage of art is employed as a neo-conservative strategy to influence morality and taste, that ultimately promotes state and business interests (Bourdieu and Haacke, 1995). In this section discussion of Haacke's art will focus only on one of each of his *systems of natural forces or elements* and *living plant and animal systems*, which were created between 1963 and 1971.

Condensation Cube (Fig. 3.2.4), exhibited at the exhibition Nul at the Stedelijk Museum in Amsterdam in 1965 (Buchloh, 1988, p. 106) and a larger version titled *Weather Cube* (Jones, 2011, p.11) two years later within Haacke's untitled solo exhibition at the Massachusetts Institute of Technology (MIT), is representative of the first stage of Haacke's art employing *systems of natural forces or elements*. The artwork consists of an acrylic cube containing water. As the temperature rises, water evaporates within the cube saturating the air and lowering the temperature. Once the temperature falls below dew point, the temperature at which water vapour condenses into liquid water, dew forms on the sides of the cube. The cycle of evaporation and condensation continues creating a microclimate or a contained weather system.

Condensation Cube displays similarities with some of Haacke's other artworks from this period such as *Rain Tower*, *Wave* and *Clear Flow* (Jones, 2011, p. 15). Each of the artworks employs an acrylic container holding water and demonstrates the process of natural forces or elements. However, unlike these artworks, which each demonstrate at most one process or two elements acting on each other such as the effect of gravity or the viscosity of different fluids mixed together, *Condensation Cube* demonstrates the process of a number of natural forces or elements continually acting on each other and moving in and out of balance. Furthermore, as Caroline

61 The reader should note the similarity with Swedish scientist Carl Linnaeus' taxonomy of *mineral*, *vegetable* and *animal;* the first natural science classification system based on shared material characteristics.

Jones remarks, unlike the other artworks *Condensation Cube* did not require being agitated by an observer to trigger the internal system and set the processes in motion (*ibid*). As such, the artwork can be understood as a turning point in Haacke's exploration of natural forces or elements.

Figure 3.2.4: *Condensation Cube (MACBA, 2016).*

As an object *Condensation Cube* is arguably sculptural, but this is assuredly the case if its manipulation and shape contribute to its internal system's process. By not requiring manipulation the focus of Haacke's art shifts away from the container to what is contained. Instead, the *Condensation Cube* functions as a framing mechanism isolating the internal system from any external systems such as the gallery, demarcating the artwork from what isn't the artwork (Haacke, n.d. cited in

Jones, 2011, p. 13). *Condensation Cube* bridges the gap between early natural force or element artworks such as the acrylic container artworks and later natural force or element artworks such as *Cast Ice, Freezing and Melting* (*ibid*, p. 61) (Fig. 3.2.6) and *Fog, Dripping, Freezing* (*ibid*, p. 66). In the later works, no attempt is made to demarcate artwork from what isn't artwork.

In the context of *Condensation Cube*, the gallery is the embodiment of the art world or institution. The idealised twentieth-century gallery, articulated in the mid-seventies as a modernist white cube (O'Doherty, 1986), is itself a system closed from the external world. Not only does the gallery function aesthetically as a controlled minimal environment for art's presentation, a "purported retreat from representation" (Jarzombek, 2005. p. 101), but it also regulates its environmental conditions to preserve the art. The *Condensation Cube* with its enclosed weather system is conceived to reside within such a gallery and to establish a relationship with it similar to the gallery's relationship with the external world. It is the gallery's artificial micro-climate, conditions achieved through the use of humidifiers and de-humidifiers, as well as visitor's body heat and air currents, which operate as triggers and ongoing variables to the processes of the *Condensation Cube*. The *Condensation Cube* is, therefore, a form of visualisation of "the physical condition of the gallery" (Gaiger and Wood, 2003, p. 216) but also symbolically embodies the architectural aesthetic of the gallery. As such, Haacke's artwork can be interpreted as institutional critique (Jones, 2011, p. 11), mimicking and perhaps mocking galleries' aesthetic and functionality. It is the first step towards his later artworks which shift from visualising material conditions to visualising the "socioeconomic relations within which art and its institutional programming find their possibilities of being" (*ibid*); that is a visualisation of the whole art world as a system rather than just one of its institutions as representative of that system.

Norbert: "All Systems Go" (Skrebowski, 2006) (Fig. 3.2.5) by Haacke is an example of the artist's *living plant or animal systems*. It is an unfinished artwork planned for Haacke's cancelled solo exhibition at the Guggenheim in New York in 1971. It would have been one of a number of animal system artworks created by Haacke that employed live animals and in particular birds. These included, a scaled-down version of Haacke's 1000 seagull air sculpture proposed for *ZERO on the Sea*

festival[62] titled *Live Airborne System* (Burnham, 1967; Fry, 1972) and *Chickens Hatching* (Skrebowski, 2006). *Norbert: "All Systems Go"*, which proposed a caged common hill mynah bird,[63] is described by Luke Skrebowski as follows:

> "A white cube. A black bird with bright yellow stripes around the eyes sits in a chrome cage. It rocks gently on its perch. Silence. Occasional scrabbling sounds as the bird readjusts its footing. Time passes. Nothing happens. Suddenly, the caged bird speaks. 'All systems go' it squawks. And again, 'All systems go.' A pause. 'All systems go. All systems go.' Repetition to inanition. 'All systems go.'" (2006).

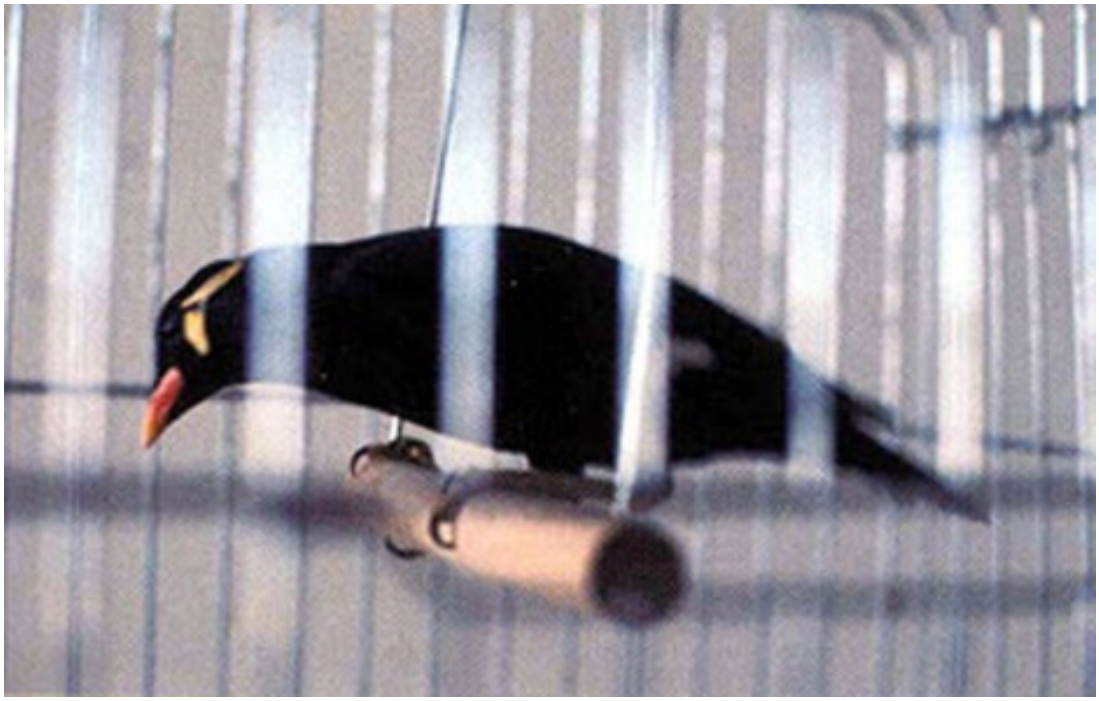

Figure 3.2.5: *Norbert: "All Systems Go" (Skrebowski, 2006).*

With *Norbert: "All Systems Go"* (Skrebowski, 2006) the title of the artwork becomes significantly more important than the titles of previous artworks such as *Condensation Cube*, *Blue Sail* (Jones, 2011, p. 33), *Chickens Hatching* and *Cast Ice,*

62 *ZERO on the Sea* was a festival planned by ZERO to occur in Scheveningen, Holland in 1966. The festival was cancelled due to lack of funding.

63 Common hill mynah birds are known to be only second to parrots in their ability to mimic the sound of human speech (Klatt and Stefanski, 1974).

Freezing and Melting (Fig. 3.2.6). All of which were more or less literal statements of what they were. The artwork takes its title from a combination of Norbert Wiener, after whom the mynah was named, and the phrase 'all systems go' associated at the time with military or NASA systems initiation (Jones, 2011). Initially, the artwork seems a parody of systems studies (Grasskamp, 2004), perhaps even of Norbert Wiener himself. Its title clumsily merges cybernetics and systems theory while its form suggests that Wiener has become nothing more than a mynah repeatedly mimicking a phrase. However, Luke Skrebowski in 'All Systems Go: Recovering Hans Haacke's Systems Art' (2008) argues that Haacke intends to institutionally critique a specific interpretation of systems studies co-opted for political and military ends by parodying it. Furthermore, he suggests that Wiener, who ceaselessly promoted systems studies post World War II but shunned government and military funding urging scientists to consider the ethics of their work, can also be viewed from this perspective of institutional critique. His embodiment as a mynah incessantly repeating the catch-phrase all systems go seems to taunt the institution with little or no understanding of the phrase's applied implications. As Benjamin Buchloh observes, systems studies is critical by nature (Jones, 2011, p. 22) and in *Norbert: "All Systems Go"* Haacke adopts that very mode of critique as a method of communication. Who better for Haacke to critique than the father of cybernetics Norbert Weiner, himself an exemplar of institutional critique. As Haacke would later remark, this strategy of "a critique of the dominant system of beliefs while employing the very mechanisms of that system" (1980, p. 37) was one he was acutely aware of concerning gallery critique. He was apparently more than willing to continue to employ the strategy within other types of institutional critique.

Skrebowski suggests however that the phrase 'all systems go' juxtaposed with Weiner's name is not just parody or institutional critique but can arguably be interpreted as a negative remark on systems themselves, that is that all systems 'go', run down, become obsolete or fail (2008). However, the word 'go' is not negative. It has both positive and negative meanings and should be understood as analogous to change, a key principle in systems studies that is equally responsible for enabling a system's functioning as well as its entropy. As such, the phrase 'all systems go' should be understood as having a dualistic meaning and Haacke's title should be perceived as an intentional play on words that takes advantage of all these

interpretations.

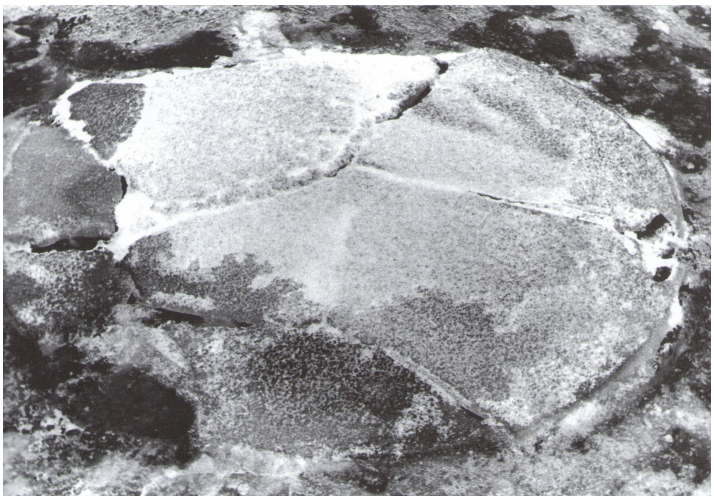

Figure 3.2.6: *Cast Ice, Freezing and Melting (Haacke, 2011, p. 61).*

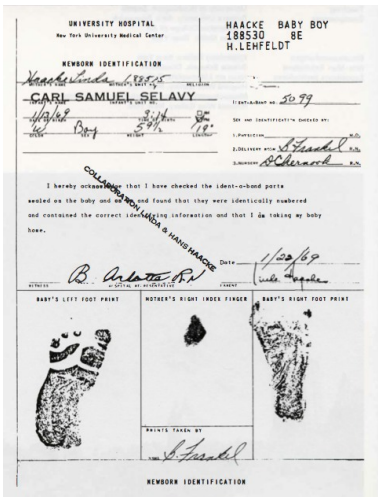

Figure 3.2.7: *«Identifikations urkunde meines Sohnes», 1.22.69 — «identification certificate of my son», 1.22.69 (Daddytypes, 2013).*

There is evidence to support the use of wordplay in the title of *Norbert: "All Systems Go"*. In 1969, two years prior to *Norbert: "All Systems Go"*, Haacke submitted the artwork *«Identifikations urkunde meines Sohnes», 1.22.69* — «identification certificate of my son», 1.22.69 (Fig. 3.2.7)[64] to the exhibition *Live in Your Head: When Attitudes Become Form Works – Concepts – Processes – Situations – Information* (Ubuweb, n.d.). The artwork, his son's birth certificate stamped Collaboration Linda & Hans Haacke, names his son Carl Samuel Selavy and makes reference to Marcel Duchamp's alter-ego Rrose Selavy, a wordplay on Eros the Greek concept of love and *c'est la vie* in French, which translates to Eros, that is life in English. Duchamp was noted for wordplay within his artworks and Haacke had long thought of his systems art as sharing similarities with Duchamp's readymades, in particular, the repositioning of mass-produced or utilitarian objects within an artistic context and as a consequence their identification as art. In *«Identifikations urkunde meines Sohnes», 1.22.69* not only does Haacke claim his son and the official

64 The title of the artwork given here omits a typographical error, identifikationsurkunde as one word, which appears in the catalogue for the exhibition *Live in Your Head: When Attitudes Become Form Works – Concepts – Processes – Situations – Information* (Ubuweb, n.d.).

documentation of his birth as a readymade, but he also makes the link to Duchamp explicitly clear by naming his son as a readymade system 'that is life'.

Burnham and Fry also discuss Haacke's art in relation to Duchamp's readymades. Burnham dedicates a chapter in the *Structure of Art* (1971) to Duchamp's influence on systems artists. Fry states about Haacke's systems of natural forces or elements, such as *Condensation Cube*, that they "extend the Duchampian concept of the ready-made to include, at least potentially, any real phenomenon in the world" (1972, p. 33). In the writing of both Burnham and Fry the concept of the readymade has much in common with systems art even if the latter more often than not completely omits the required object of the former. This similarity is evident in Haacke's art when the artist identifies a naturally occurring process, such as condensation, facilitates its occurrence, identifies it as art and documents it. In the case of *Norbert: "All Systems Go"*, one of Haacke's living plant or animal systems, Fry states that this extension of the readymade goes further still and that it is a system twofold:

> "not simply a biological ready-made presented as a real-time system, but also a social system through its involvement with human speech, learning patterns, and information retrieval" (Fry, 1972, p. 41).

There are consequently multiple overlapping systems at play in *Norbert: "All Systems Go"*. There is the biological system of the mynah, which given its species can take sound input to modify its behaviour. Then there is the system the artist establishes with the mynah by purchasing it and training it to say 'all systems go' through repetition of the phrase (Jones, 2011). Similar to the *Condensation Cube* there is also the exhibited contained system, this time contained in a cage and so more porous to influence, which can be affected by the external world such as observers within a gallery. Observers, upon hearing the mynah say the phrase, are prompted to respond similarly creating a feedback loop with it, training the bird throughout the exhibition to say new phrases and reconfiguring the contained system.

By removing the bird, a biological system, from its natural environment, placing it where it is out-of-place within the modernist concept of a gallery, the retreat from representation in the natural world (Jarzombek, 2005), caging it and employing 'go' in

the artwork's title, Haacke is also potentially enabling observers to intervene in *Norbert: "All Systems Go"* in another way. The actions combined could suggest to the observer to liberate the bird. Setting the bird free would irreparably change the artwork's system and possibly cause its entropy. It would disrupt the status of the gallery as set apart from the external world and identify the observer as critiquing it. Skrebowski states that this must be considered as a possibility quoting *Ten Turtles Set Free* (2008, pp. 76–77) as a contemporaneous artwork that deals with ideas of liberation. He states that in *Norbert: "All Systems Go"* the observer:

> "Rather than submit to the tedium of passively engaging the piece on its ostensible, institutionally sanctioned, terms, … might step in and realign the rules. The system could be opened along with the cage" (*ibid*).

Haacke who had, as discussed above, already subtly institutionally critiqued the art world with the *Condensation Cube*, therefore, proposes in *Norbert: "All Systems Go"* an overt and direct institutional critique of government and military force. However, *Norbert: "All Systems Go"* potentially once again also critiques the art world as well. With regard to Haacke's later career, where institutional critique features as a major aspect of his exploration of human society as a system, *Norbert: "All Systems Go"* can, therefore, be understood as a pivotal artwork that moves Haacke's institutional critique beyond the confines of the art world.

Haacke's initial application of systems in art, which both he and Burnham considered as a total esthetic, was utopian in that it aspired to rethink art and its relation to objecthood. However, unlike Schöffer's art, which increasingly demonstrated his conviction in a technological utopianism, Haacke's art from the *Condensation Cube* onwards became critical of everything it explored. From the 1970s onwards Haacke's art shifted away from natural existing systems and their processes to explore *human society as a system*, his third application of systems to art. Existing human systems, already identifiable as having a social function, became the conceptual basis of Haacke's art within which he revealed the inputs, processes and outputs that were often corrupt. Haacke's art from this point onwards can be considered to demonstrate a critical perspective, or perhaps a realism concerning systems as they dealt with active systems in the world and not just isolated in a gallery. As Halsall and Skrebowski suggest this may be reactionist to the use of

systems thinking by institutional powers, themselves considered as 'the system', for military, political and economic ends (2008, pp. 101–102; 2008, p. 56). Alternatively, it may be the problematic merging of military strategy with art practice as suggested by Burnham (Halsall, 2008, p. 106). However, it is more reasonable, given the forty-five year and counting longevity of this third stage of his practice, that Haacke's art is, in fact, responding to systems permeating numerous fields in contemporary society and that his art is constructive in its social function of revealing the structure and workings of those systems.

The concept of art as having a social function emerged from 1960s counter-culture assembled under various causes such as the global anti-Vietnam war movement, student protests and civil rights marches in numerous countries. The art of Stephen Willats[65] is a convergence of this philosophy, the belief that art can be a part of positive social change, and systems thinking. Predominantly considered a conceptual artist engaged in social practice, Willats is not often incorporated into discussions of systems arts. Not formally affiliated with any artistic movements and having few comparable peers, he has, in many respects, been an outsider to contemporary art. In recent years, however, recognition of his contribution to systems art has been acknowledged.[66] Unlike Haacke, Willats does not identify existing systems as art per se, but instead initiates systems and applies them as art. In the 1960s much of his practice consisted of diagrammatic drawings, designs or plans of theoretical systems and mechanical-like systems. These bear a resemblance to Roy Ascott's art at the time, his former tutor on the Groundcourse at Ealing Technical College & School of Art and subsequently his colleague at Ipswich Civic College (Mason, 2008, pp. 70–71).

Willats has remarked that observers have conventionally had an isolated relationship with art, and so he set about to create art where “the artist would not be isolated from the viewer, the artwork would not be isolated from the world” (*ibid*, p. 31). In this he, like many artists of the time, address what I have termed as the grand-project of art in the modern era; that is the role of the artist, art as object, the means of its creation

65 Stephen Willats (b. 1943), English artist.

66 For example Willats' inclusion in the research event *Signal:Noise* at The Show Room (2012) and *Systems* (2015), a collection of texts published by Whitechapel Art Gallery.

and the role of the observer (see chapter 3.1). Andrew Wilson states that between 1968–72 Willats' art shifted emphasis to this end from art as object exhibited in gallery spaces to art as event in public spaces (2010, p. 23). Willats terms the artworks created at this time as his neighbourhood project artworks (*ibid*). The shift of emphasis and the artworks created from this period onwards can be considered as comparable to Kaprow who transitioned from painting to performance because of similar concerns regarding objecthood.

Figure 3.2.8: *In the Beginning (Willats, 2011 a).*

Figure 3.2.9: *Signs and Messages from Suburbia (Willats, 2011 b).*

The issue of objecthood, however, is not Willats' primary concern. For example, he creates diagrammatic drawings as part of his practice. They function as plans or *input* to the *process* of the social events that will later occur as part of his artworks. However, the drawings are also conceptual frameworks that explain the principles and structure of his art. They are often exhibited in galleries as both artworks and a form of theory as well as featuring heavily in Willats' publications. As such, the drawings are equally an *output* that combines theory and practice. Willats also employs a variety of other visual forms including design, photography and video as communicative multi-media that appears as part of the process of the social events and as an *output* that documents them. Over the course of his practice inputs and outputs have merged through a collage aesthetic. Visual elements are repeatedly employed in artworks. These include, lines as links in *I Don't Want to be Like Anyone Else* (Casser and Ziegler, 2010, pp. 156–162), meshes or nets in *From a*

Walk to the Supermarket (*ibid*, pp. 204–207), arrows as part of *In the Beginning* (Willats, 2011 a) (Fig. 3.2.8) and boxes or cells resembling a database in *Signs and Messages from Suburbia* (Willats, 2011 b) (Fig. 3.2.9). All these visual elements appear in his drawings but also within explanatory media during the process of the social events and documentary media once the events are complete. When combined with text, photography and/or video within the explanatory and documentary media, the college aesthetic produced is suggestive of the feedback process of the artworks they are created within.

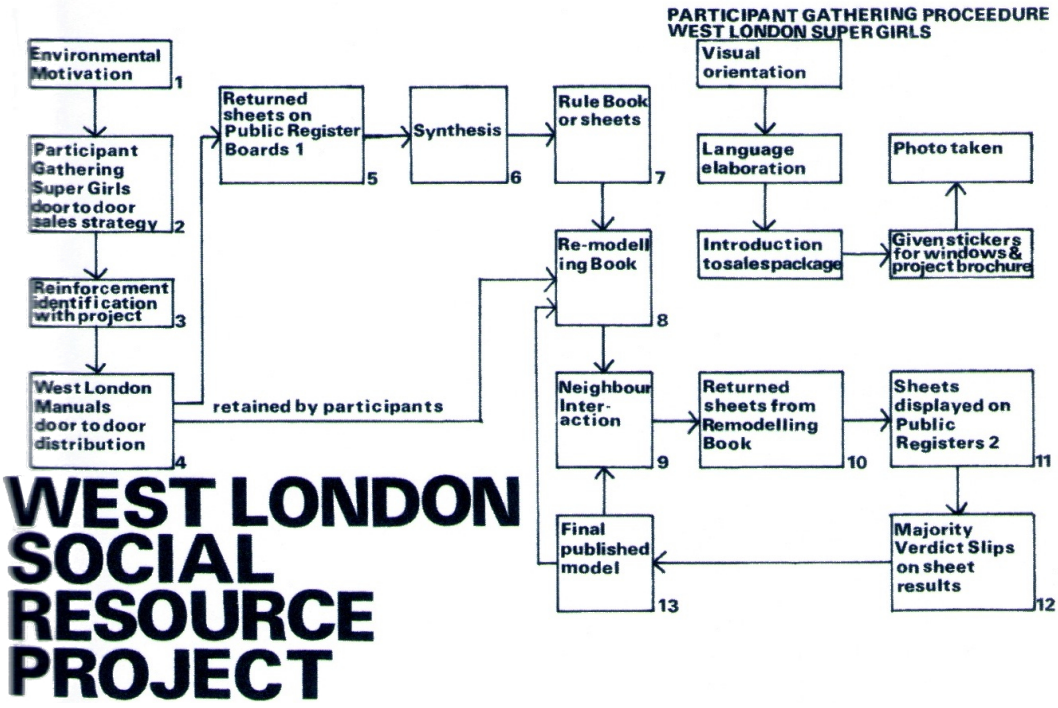

Figure 3.2.10: *Diagram explaining the structure of the West London Social Resource Project (Willats, 2010, p. 41).*

Willats' artworks allow him to intervene in existing social situations. The intended observer of the artwork's explanatory and documentary media, what is publicly distributed and exhibited, becomes the subject of and rationale of Willats' art (Willats, 1986). However, the observer is also, through a feedback model of interaction, enabled to become a participant in the art thereby affecting its outcome. Once the concept of the artwork is in place, a relationship is established between artist and participant that becomes non-hierarchical in how it unfolds in public space. For example, in the *West London Social Resource Project* (Willats, 2010, pp. 38–61), the

social context for the artwork was four communities in West London connected by a road yet separated by social class. The artist designed an initial model through which participants could contribute and shape the outcomes of the artwork (Fig. 3.2.10). Participants, consisting of upper middle class, middle class, lower middle class and working class, were set the objective of each arriving at common social models (*ibid*).

Figure 3.2.11: *Leaflet for Area four, Harrow, West London Social Resource Project (Willats, 2012, p. 15c).*

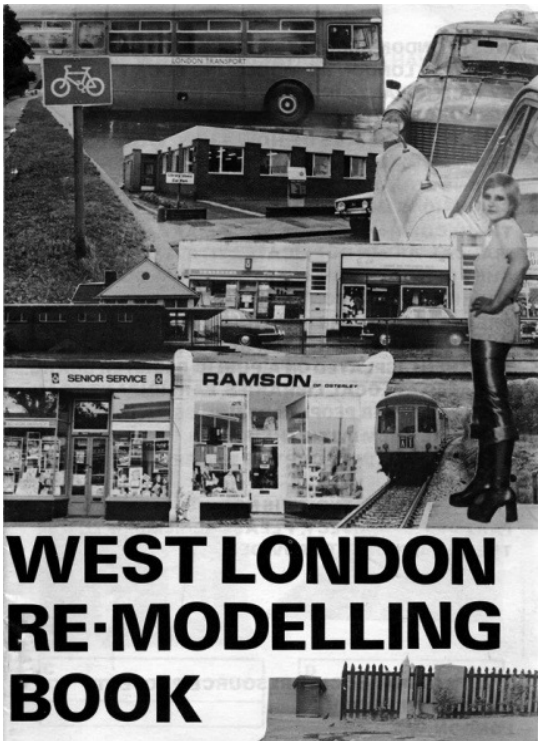

Figure 3.2.12: *The West London Re-modelling Book, West London Social Resource Project (Willats, 2010, p. 58).*

The *West London Social Resource Project* was split into three stages. In stage one, door-to-door interviews were employed to select participants who would willingly contribute over the course of the artwork's duration (*ibid*). Participants were supplied with posters to place in their front room window and leaflets (Fig. 3.2.11) to distribute in their area (*ibid*). Strategies were designed to promote the artwork and identify participants within areas, generating interaction between previously unassociated residents (*ibid*). A second door-to-door interview followed with the distribution of the *West London Manual* (*ibid*). The manual's function was to pose problems to

participants about their immediate environment and allow them to articulate through several techniques their mental model of it (*ibid*). On collection, the responses were displayed on Register Boards in a public place such as a local library allowing all participants and other residents to compare outcomes (*ibid*).

In stage two, a panel of experts consisting of a cybernetician, a learning psychologist and a perceptual psychologist produced a *Rule Book* containing personal evaluations of participant responses and statistics of participant responses from stage one (*ibid*). The *Rule Book* was then distributed to participants to provide them with an exterior view of outcomes to date along with the *West London Re-modelling Book* (*ibid*) (Fig. 3.2.12). The *Remodelling Book* was similar to the *West London Manual* in its problem-led format (*ibid*). Participants were challenged to redesign the mental model of their social and material environment. Once again, outcomes of this were collected and displayed in public areas (*ibid*) (Fig. 3.2.13). Residents were invited to vote and comment on the participant models proposed, ultimately feeding into stage three's final models. In stage three, the most voted for models with any adaptations suggested through resident comments were published with a final evaluation by the panel of experts (*ibid*).

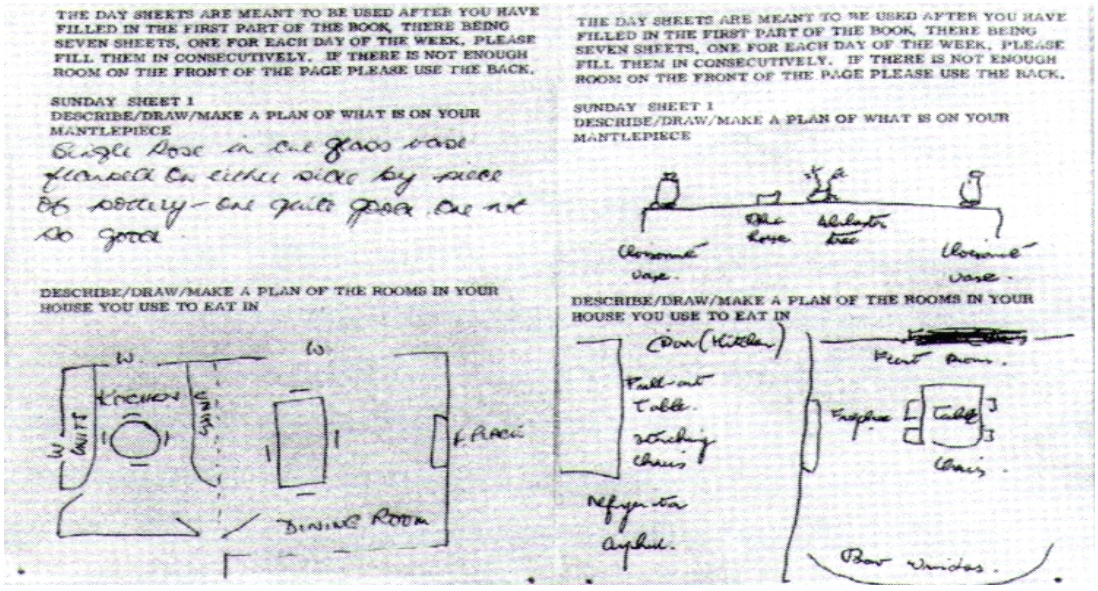

Figure 3.2.13: *A selection of participant responses from the West London Re-modelling Book on the Public Register Board at Greenford Library, part of the West London Social Resource Project (Willats, 2011 c).*

Similar to Haacke's art, which ultimately is performing a positive social function by critiquing institutional systems while employing the mechanisms of those systems (Haacke, 1980, p. 37), Willats' art is:

> “conceived to act, as art-work, as an open-ended, non-judgemental catalyst for change within a context of social relations, using the language of the context within which they are sited” (Wilson, 2010, p. 23).

Haacke's art, from *systems of natural forces or elements*, *living plant or animal systems* to *human society as a system*, aims to reintegrate art into life[67] through various strategies of participation, moving out into public space or critiquing institutions. Willats' art, however, does not only aim to reintegrate art into society but in a sense brings life into art by actively assisting society through the initiation of social change.

67 See the discussion at the start of this section referring to Kaprow's art and life.

3.3 New media art

In the 1990s new media art emerged and distinguished itself from previous art forms in a number of ways. It is a hybrid art, combining a variety of disciplines' processes, themes and subject matter and frequently considers form without materiality. Facilitated by the developments of mass consumer computing in the 1980s and the unprecedented access artists now had to computers, it is predominantly a programmed digital form reliant on electronic platforms. Employing programming enables a new media artwork to change from being a fixed object in space and time, that is art as object or what Fried termed objecthood (1967) and Burnham's systems esthetics sought to move beyond (1975), to a continually variable process or system that occurs within a range of spaces and times. Bolstered by the emergence of the World Wide Web in the early 1990s that enabled rapid and global interaction, new media art lends itself with ease to being communicative.

This section explores new media art as the third of the selected art developments considered as a key part of the history of networked art. Discussion first focuses on new media art's ability to change from a fixed object in space and time to a continually variable process or system that occurs within a range of spaces and times by exploring interaction as its key strategy. Interaction is positioned as emerging from the concept of behaviour in system studies and discussed through several critical writings as new media art's contribution to the grand-project of art in the modern era; that is art as precious or even sacred object, the means of its creation, the role of the artist and the role of the observer. Finally, the section proposes three variations of how interaction occurs and discusses three artist's works as examples.

The term new media art has been chosen in this research in preference to electronic art, computer art, digital art and interactive art primarily because these can all be considered as specific types or subcategories of new media art. Electronic art, computer art, digital art and interactive art all derive their names solely from the technology, format or delivery method of the artwork. However, I propose that the title of new media art explicitly positions itself in relation to preceding art of the twentieth century and so foremost enters into a dialogue with art rather than

technology. New media art appropriates strategies from a combination of twentieth-century developments in art and synthesises these in ways made possible as a result of computing technologies. It adopts reproducibility and mass distribution from media art; art as response to developments in new technologies (Tribe and Jana, 2006); ideas of the dematerialization of art as object from conceptual art (Lippard, 1997); art as a live event from performance art; video art's conception of art as a time and screen-based form; ideas of non-linearity in literature used by Jorge Luis Borges, Brion Gysin, William S. Burroughs and members of the Oulipo[68] (Wardrip-Fruin and Montfort, 2003) amongst others; and both concepts of art conceived as a system and a system positioned as art from cybernetic art and systems art (see chapter 3.1 and 3.2). In this section, it will be argued, however, that more than any of these it is interactivity that quickly became the key characteristic of new media art and has been widely discussed as such (Popper, 1993; Rokeby, 1995; Weibel, 1996; Stiles and Shanken, 2000; Manovich, 2001; Kwastek, 2013). It has contributed to the rationale of new media art's conceptual basis as well as its title and, most importantly in the context of this research, contributes to the definition of the proposed networked art in the following chapter.

By the 1990s within systems studies there had occurred an almost complete consensus concerning system behaviour terminology (see chapter 2.3). The term interaction, had taken precedence over terms such as behaviour (Ackoff, 1981, p. 15–16), conversation (Pask, 1968; Pask, 1975), relation (van Gigch, 1991, p. 30; Klir, 1991, p. 5; Langefors, 1995, p. 55), exchange relation (Podolny and Page, 1998, p. 59), influence (Jones, 1982, p. 45; Flood and Carson, 1993, p. 53) and affect (Backlund, 2000, p. 448). Second order cybernetics, which incorporated the observer into the system (Umpleby, 2001), was by now well documented. Its ideas had been disseminated effectively, and it had been in many ways predictive of the paradigm of mass consumer computing. Specifically, how computing incorporated interface design for human-machine interaction (Norman, 1986), later spawned fields dedicated to its study such as human-computer interaction (HCI) and graphical user interface (GUI) design and how these, in turn, facilitated changes in media, enabling on-demand, individual or personal media. The use of the term interaction within the context of this research, however, is employed in relation to contemporary art. While

68 Oulipo or Ouvroir de Littérature Potentille translates as Workshop for Potential Literature.

it has been influenced by several developments in computing and media, these should not be considered as the only factors which contributed to its definition. As such, the focus of this section is to develop further the discussion of interaction started in chapter 2.3 but this time from a contemporary art perspective. Additionally, the section explains how interaction came to play an important role within contemporary art, specifically in the form of new media art, how new media art developed its own theories of interaction and finally interaction's importance to the proposed networked art.

Interaction in art must initially be viewed as a proposed strategy to addressing what I have termed as the grand-project of art in the modern era, which questions conventional concepts of the art form (see chapter 3.1). Interaction raises questions concerning the role of the artist, the artwork as material object, the method of its creation and the role of the observer. In 'From participation to interaction: toward the origins of interactive art' (1996), Söke Dinkla outlines a vast number of art movements, developments and practitioners[69] that formed a part of the grand-project and can be considered as contributing to the inception of interaction in art. Shanken lists interactivity alongside a number of strategies such as “process, kinetics, … audience-participation, duration, and environment” (2002, p. 6) covering almost the same art movements, developments and practitioners. In the discussion of both authors, it is evident that the art movements, developments, practitioners and their strategies form a significant portion, if not the majority, of artistic endeavours in the twentieth century. Several precede systems studies, some by almost half a century, and only later would systems studies influence ideas and strategies that had already been set in motion within art.

Perhaps the first attempt to expressly define interactivity in relation to artistic strategies of the twentieth century is Popper's discussion in *Art of the Electronic Age* as follows:

69 These include: Futurism, kinetic art, Dada, Marcel Duchamp, Nicolas Schöffer, John Cage, Fluxus, the Happenings, Robert Rauschenberg, Roy Ascott, Nam June Paik, Yoko Ono, Valie Export, process art, participatory art of the 1960s, concept art, Situationism, Art and Technology initiatives (such as *Experiments in Art and Technology*), cybernetic art, closed-circuit video installations, video art, Jeffrey Shaw, Lynn Hershman Leeson, performances, site-specific works, Peter Weibel, Bill Seaman, Myron Krueger and David Rokeby (Dinkla, 1996).

> “the term 'participation,' in the context of contemporary art, refers to a relationship between a spectator and an already existing open-ended art work, whereas the term 'interaction' implies a two-way interplay between an individual and an artificial intelligence system” (1993, p. 8).

Popper's discussion refers to the use of participation in art from the 1960s and positions interaction as a more recent strategy (*ibid*) that emerges or evolves from it. His definition of participation and interaction, as well as how they are distinguished, is quite precise. Participation situates itself historically as a part of theory relating to the open work (Eco, 1989).[70] The artist retains their authorship in the creation of a finite but open-ended artwork and delegates its 'reading' to their audience (Manovich, 2001, p. 163) who defines how they assemble what the artist has provided. Interaction, however, aligns itself with scientific developments, notably systems studies and artificial intelligence. The role of the artist is drawn into question in relation to the audience who is interacting or using and thereby changing the artwork. In addition to being more recent than participation, interaction in Popper's discussion is indicated as being a more advanced and technologically sophisticated strategy.

Dinkla supports Popper in the chronological relation between participation and interaction and explains that the progression from pre-participation art through to interaction in new media art was a transition from a passive to an active role for the observer (1996, p. 289). Regardless of whether this was, in fact, a chronologically linear progression, both authors' discussions foreground a change in the role of the observer. More often termed the spectator or audience within art discourse, the observer invariably becomes a user in new media arts discourse. Furthermore, both authors' writings suggest an overall optimistic view of interaction as a liberating force for the user and perhaps the artist. However, this is more often than not challenged in discussions by later authors with the most pessimistic appraisals of interaction being “one of those euphemisms like 'democracy' or 'equality'” (Seward and Swenson, 1994 cited in Stiles and Shanken, 2000, p. 40) or even as neo-liberal rhetoric, “a form of freedom, a liberation from the tyranny of authorship and the servile passivity of reading” (Cameron, 2008).

70 Umberto Eco's *Opera Aperta* — The Open Work, was originally published in Italian in 1962 and translated into English in 1989. However, the first French translation was 1965 so Popper, having lived and worked in France for numerous years, would no doubt have been aware of Eco's writing.

The majority of discussion about interaction in new media art has continued the emphasis on user as part of art's discourse on spectatorship and therefore centres on scenarios of user-to-user and user-to-system interaction (see chapter 2.3). Additionally, discussion considers the effect of interaction on the artist's role or their authorship and the reconceptualisation of the artwork from a fixed object in space and time to a variable system. Changes in spectatorship, authorship and the form of the artwork combined facilitate interaction in new media art and indeed participation in much of participation-based art. However, while the change in spectatorship is significant in new media art, it is in actuality only part of what interaction is. It confuses the general concept of interaction with what should more precisely be termed *user-based interaction*, the interactive paradigm that explicitly involves a user. It suggests that interaction in new media art only occurs with a user. Within new media art, the artwork is a programmed form that is variable in space and time. It can become independent of the interaction of a user and be interacted with in numerous ways by anything capable of interacting. Therefore, the terms of interaction and user-based interaction must not be used as synonyms. Based on Roy Ascott's forms of behaviour outlined in chapter 3.1, this research proposes that in addition to user-based interaction, interaction occurs in new media art in two other notable ways. These are *artist-based interaction* and *generative interaction* (Fig. 3.3.1).

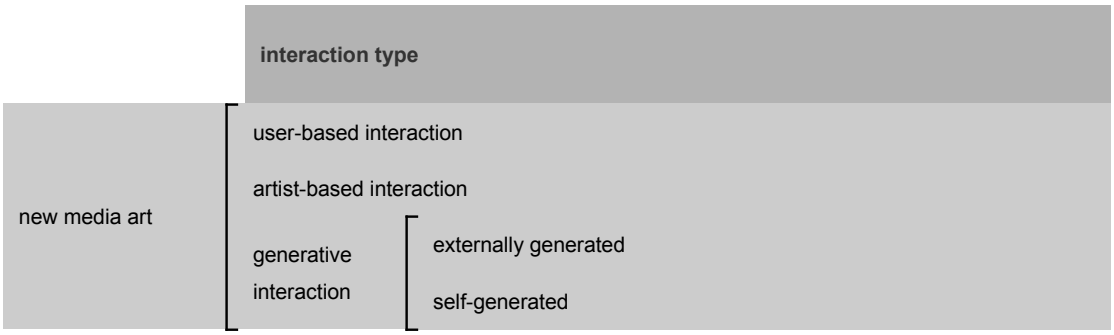

Figure 3.3.1: *Types of interaction present within new media art.*

Artist-based interaction is distinct from the artist's creative process. The artist may sometimes assume what would typically be considered as the role of a performer during the presentation of the artwork, changing it in front of an audience who may

also be interacting with the artwork. By doing so the artist in a sense merges their role as creator with the role of a user to be a special type of user-based interaction, that is the artist as the user. Artist-based interaction and user-based interaction are both fundamentally human-machine paradigms of interaction. Consequently, they share several commonalities such as the requirement to use an interface between human and machine.

Generative interaction occurs in new media art in two distinct ways. These are either between the artwork and an external factor to the artwork other than a user, such as environmental conditions or between the artwork's parts, such as programmed classes, objects, plugins or hardware components. These can respectively be considered as interaction *externally generated from without* and interaction *self-generated from within* the artwork.[71] New media art that employs generative interaction is therefore independent of users. Nevertheless, this does not mean that new media art that employs generative interaction has no human interaction. Interaction occurs between artist and artwork during the process of creation of an artwork. Distinct from artist-based interaction described above during the presentation of the artwork this occurs in all forms of creative process, including for artworks that are generative, and so is not specific to art that employs user-based interaction or even to new media art.

Consequently, user and/or artist as user should not be assumed to be included in the presentation of all new media art although they are, as they are in all artworks, included as observers. They are only potential users of the environment created by new media art. In achieving this, new media art is in a sense a *Gesamtkunstwerk*;[72] a perfect synthesis of art forms. It is not only a synthesis of aspects of separate art forms ranging from electronic art, computer art, digital art, interactive art, conceptual art, video art, literature and cybernetic art amongst others but more importantly a

71 While the term *from without* is predominantly considered archaic, it is purposefully employed in this research to counter the meaning of *from within*. The terms primarily define a physical or spatial position, that is without meaning outside and within meaning inside, and refer to the positioning of the observer in science pre-cybernetics and post-cybernetics (see chapter 2.3). Since second-order cybernetics states that all observers of systems are participants in those systems, what is termed as without in this research should not be considered as really outside an artwork but instead as not created specifically as part of an artwork. In addition to physical or spatial position, the term without is employed to imply not having or possessing that which is interacted with.

72 *Gesamtkunstwerk* translates as total work of art.

synthesis of their strategies of spectatorship, authorship and objecthood. Individually, observer or user, artist and artwork are not unique in new media art or indeed any other art form. It is only through various combinations of them in new media art that they change and become, as a result of their interaction or connection with each other, unique and distinguishable from their occurrence in other art forms. Additionally, while user-based interaction, artist-based interaction and generative interaction should be understood as distinct types of interaction in new media art, they should not be considered wholly segregated as they can and often are combined in various manners.

It is important to note how user-based interaction, artist-based interaction and generative interaction correspond with the systems theory terms open and closed systems (see chapter 2.3), as well as the term isolated system. For example, in a user-based interactive artwork in new media art, the user is initially outside or without the artwork, observing, and through interaction shifts to being inside or within the artwork. The artwork is open and receptive to interaction, and therefore it is an open system. Generative new media art's subcategory of artworks that are externally generated are equally open systems as the artwork is open to non-user-based forms of interaction from without. However, the subcategory of artworks that are self-generated are closed systems as interaction only occurs between the artwork's parts or from within.

The *Encyclopedia of Systems and Cybernetics* states that open systems are “able to selectively exchange matter, energy and/or information with its environment”, a closed system is “able to absorb and emit energy and information, but not matter” while an isolated system “makes no exchange of any kind with any environment” (Institute for the Study of Coherence and Emergence, 2012). These definitions within the context of new media art are problematic because energy, information and matter are no longer clearly distinct. As a predominantly digital, 'virtual' and often networked art form what precisely can be defined as the matter of new media art? Is it the electronic devices it is reliant on or something else?

Systems theory provides a solution to this problem. It considers systems, material or otherwise, as existing systems (Institute for the Study of Coherence and Emergence,

2012) and not only possible systems such as the consideration of closed systems as mathematical concepts in cybernetics. New media artworks, material or otherwise, within a wider art context must equally be considered as existing as conventional artworks that are object-based. As such, both object-based artworks and new media artworks are equally a part of reality, specifically the artist's reality of creating an artwork and the observer's and user's reality of experiencing the artwork. New media art's 'matter' therefore is the electronic devices it is reliant on but it is equally the text, image and audio as light and sound, which are all forms of information conveyed through energy. Consequently, interaction, also a form of information conveyed through energy, must also be considered as new media art's 'matter'. New media art's 'matter' exists. However, it is not necessarily material in nature. It may be 'real' or 'virtual'. To define 'real' as material and 'virtual' as its antonym is therefore incorrect. 'Real' instead means existing while 'virtual' is existing but specifically immaterial. Consequently, in new media art as a result of an artwork's existence as 'real' or 'virtual' and its reliance on one form of interaction or another the artwork can never be an isolated system as isolated systems do not exist. In the terminology of Deleuze and Guattari's Ontological Quadrivium (see chapter 1.3), they are only possible.

	interaction type		system type	example artwork
new media art	user-based interaction		open system	*[V]ote-Auction*
	artist-based interaction		open system	*[V]ote-Auction*
	generative interaction	externally generated	open system	*Collection*
		self-generated	closed system	*Process*
			no isolated system	

Figure 3.3.2: *Interaction types of new media art and their system type mapped to examples. Note that in new media art there can be no isolated system.*

Examples of artworks that involve user-based interaction and artworks that involve other types of interaction will help to clarify the distinctions discussed above. As these are discussed in turn, Figure 3.3.2 can be referred to as a reference for each artwork's interaction and system type. *[V]ote-Auction* (2000 a) (Fig. 3.3.3) by

collaborative artists Ubermorgen[73] is an example of a user-based interactive new media artwork. *[V]ote-Auction* was an auction website that acted as a middle-man offering US voters the possibility of selling their vote to the highest bidder during the 2000 Al Gore versus George W. Bush presidential elections. The artwork employs the internet as a global communication form and explores the relationship between democracy and capitalism. It critically and satirically commented on the US voting system and its use of political consultants who employ campaign contributor donations to market politicians and commodify voters (Ubermorgen, 2000 a).

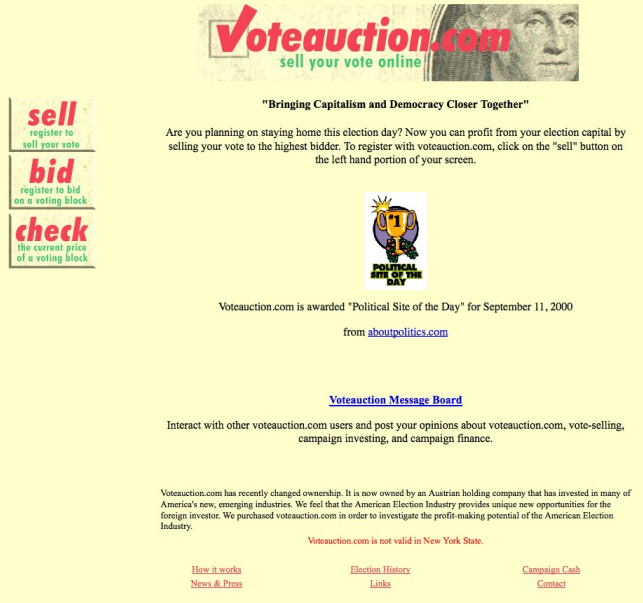

Figure 3.3.3: *[V]ote-Auction (Ubermorgen, 2000 a).*

Figure 3.3.4: *[V]ote-Auction Seal (Ubermorgen, 2000 b) and [V]ote-Auction 700Kg (ibid, 2005) exhibited in 2013 at Carroll / Fletcher Gallery, London.*

During the run-up to the election, an estimated 450 million users took part in the website. The artists were interviewed about the artwork on a daily basis with over 2500 features appearing in online media, print, radio and television including a feature on CNN's *Burden of Proof* (*ibid*). Thirteen court cases were filed against the artists, four were started in individual US states, and in two states the website's

73 Ubermorgen, Lizvlx (b. unknown) and Hans Bernhard (b. unknown), Austrian artists.

domain was blocked (Arns, 2003). However, ultimately all cases were dropped as the website was hosted outside of the US and its creators, both non-US citizens, could not be charged. As a consequence of the artist's interviews and the mediatisation of the artwork, *[V]ote-Auction* can also be considered as an example of artist-based interaction. Consideration of *[V]ote-Auction* as an example of artist-based interaction is upheld in recent exhibitions that exhibit artefacts and paperwork, such as those produced by legal proceedings at the time of the website's presence online, alongside the website (Fig. 3.3.4).

[V]ote-Auction had many of the features of prior artworks created in the modern era. For example, the 'virtual' nature of the artwork disassociated it from objecthood and aligned it with conceptual art. Its temporary existence online throughout the election meant it had a finite duration. Combined with the artist's mediatisation of the artwork through interviews it, therefore, had characteristics typical of performance art (Bookchin, 1999). However, *[V]ote-Auction* as a new media artwork also demonstrated that it was a new type of artwork. It did this in its use of the internet as a 'site' for process-based action. As such, it is often cited as a work of internet art, that is new media art employing the internet (see chapter 1.1). More important than this, however, is how new media art's key characteristic of interaction, specifically user-based interaction, was strategised as part of that process-based action.

While on the one hand *[V]ote-Auction* employed the internet for critical comment on political events, on the other hand, it was equally critical of the internet as the interactive democratising form many declared it was. Users interacted with each other through the website as a form of networked, shared and public 'virtual' space. Their ability to interact directly with each other within the space by buying and selling their votes subverted the intent of the political system. However, if user-based interaction combined with the mediatisation that brought the artwork both mass and national attention had not occurred, the artwork would have been largely ignored and ineffective. *[V]ote-Auction*, therefore, circumvented centralised political and mass media one-to-many broadcasting forms of communication used to advertise politicians and would if votes had in fact been sold on the website, have had an impact on 'real' space and its events. The artwork demonstrated how new media forms outmoded more established media and communication forms and the

established institutional methods of utilising them. As such, the user freedom promised by interaction, and indeed the internet (Cameron, 2008), was turned against its neo-liberal advocates allowing the network created within the context of the artwork to supplant their hierarchies.

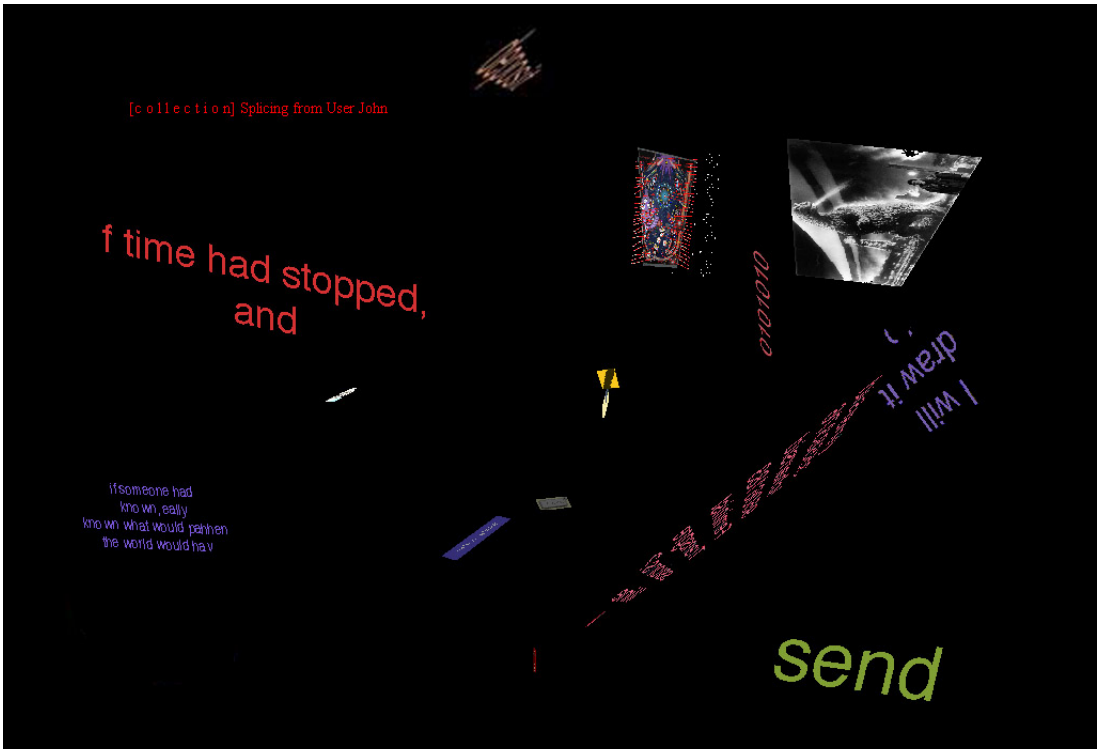

Figure 3.3.5: *[collection] (Flanagan, 2002).*

[collection] (2002) (Fig. 3.3.5) by Mary Flanagan[74] and works from the *Process* series, such as *Process 16* (2006) (Fig. 3.3.6), by Casey Reas[75] are two examples of generative new media art indicated in Figure 3.3.2. As such, they require no user-based interaction and are therefore clearly distinct from *[V]ote-Auction*. *[collection]* and the *Process* series respectively demonstrate the distinction between artworks that are externally generated, that is generated by external input, and artworks that are self-generated by their parts interacting. *[collection]* is a networked computer application that functions as a client to a centralised online server. The application sources data from a user's hard drive including “sentences from emails, graphics,

74 Mary Flanagan (b. 1969), American artist, author, educator, and designer.

75 Casey Reas (b. 1972), American artist.

web browser cached images, business letters, sound files" (Flanagan, 2002) and sends these to the server. All user data collected is then mixed and displayed back to the user as a 3D visualisation.

[collection] questions authorship in numerous complex ways. Is the process of sourcing data from a user's computer a type of user-based interaction or is it interaction between the user's computer and server? Flanagan suggests that from the user's point of view, sourcing data that has been created by the user and sourcing data that has been created by the computer for its organisational and structural purposes may not be equally meaningful when authorship is considered (*ibid*). The artist points out that *[collection]* intentionally sources a combination of user-created and incidental data (*ibid*). If the artwork is considered as allowing user-based interaction, then it must at least be acknowledged that the incidental data is not meaningful to the user in that it was not created by user-motivated interaction. Additionally, data that has been created by the user is unlikely to have been created expressly for interaction with the artwork as it was mostly, if not all, created for other purposes. As such, user-created data is in a sense also incidental to the artwork. Its use as a means to interact with the artwork is not purposeful in that the user does not directly or immediately shape the data as input to the artwork as part of a feedback loop or user interaction cycle (Kirsh, 1997).

Acknowledging the ambiguous role of data as input, Flanagan refers to it as "saved content" resulting "from the participants' interactions with the machine" (Flanagan, 2002). The user is without a doubt a user of their computer. However, it is questionable that they are a user of the artwork. Instead, they are an observer of it and as such perform a role that is no more critical than it is in most non-interactive art. Since *[collection]* sources all of its content externally, interaction does occur between it and the user's computer defining it as a generative artwork that is externally generated. *[collection]* therefore is a context or what might be conventionally considered a support for the art to occur within. Consequently, the artist's authorship of the artwork is also in question. Conventionally, the artist would be in control of the artwork, defining its message or purpose through its content. With *[collection]* the artist instead, to borrow a term from computer programming, assumes the role of a framework programmer and allows the message or purpose to

emerge as a result of the externally generated content.

The *Process* series, including *Process 16* (Fig. 3.3.6), by Casey Reas, is an example of artworks that are self-generated by their parts interacting. There is a long history of self-generated art in the modern era, much of which precedes new media art. Examples include some of Nicolas Schöffer's early artworks (see chapter 3.1), Jean Tinguely's machines (see chapter 3.2), the machine-based drawings of Desmond Paul Henry and Harold Cohen's image creating computer program AARON. Self-generated artworks have, however, remained a much more specific type of generative art, and this remains consistent in new media art. The reason for this may lie in the fact that self-generated artworks are closed systems. Not alone do they exclude users but, unlike externally generated artworks, they also do not allow input from their environment. As such, they can be considered to push against what I have termed as the grand-project of art in the modern era, in this instance by not questioning the role of the observer or art as object (see chapter 3.1).

Figure 3.3.6: *Process 16 (Reas, 2006).*

Process is a series of computer applications that self-generate drawings. Each application, each *Process*, is initially defined by a short text or set of instructions by the artist that is then encoded within the application and allowed to evolve.

> "A Process interpretation in software is a kinetic drawing machine with a beginning but no defined end. It proceeds one step at a time, and at each discrete step, every Element modifies itself according to its behaviors. The corresponding visual forms emerge as the Elements change; each adjustment adds to the previously drawn shapes" (Reas, 2010).

The applications foreground the live process of the act of drawing or mark-making in general rather than the result and what is depicted. They draw inspiration from twentieth-century developments in art concerning action and process; notably Jackson Pollock and his documented influence on performance (Ascott, 1966–67, p. 121; Bishop, 2006, p. 102). Within the *Process* series, however, unlike within the oeuvre of Pollock, the artist is not the performer. Instead, similar to the artist's role in relation to *[collection]*, the artist is a framework programmer defining the application's complete set of behaviour. The creation of what is performed and seen by an observer is undertaken by the application within that set of behaviour. However, unlike *[collection]* the creation and its performance are not in any way influenced externally once the application is run. While Pollock adds a new dimension to the role of the artist, specifically the painter, as a performer and expands art to include process rather than just its outcome, he remains the sole author of the artwork created. Ultimately, the artwork has a defined ending, it is as a painting finite, and the result is "an object - a stretched and limited canvas" (Lillemose, 2006, p. 122), which consequently remains invested in the concept of objecthood. The *Process* series, however, delegates part of the conventional role of the artist to the application, who becomes the artist's agent, and so fundamentally establishes the artist's contribution as primarily conceptual and contextual. The artwork itself, consisting of light on a screen or projected, is visually temporary and specific to the period the application runs for but is potentially never-ending. As a result, it constitutes the very antithesis of objecthood.

In the three new media art examples discussed above of the distinctions between user-based interaction, generative interaction (both externally and self-generated) as well as the brief discussion of artist-based interaction, it is interaction itself that is constant regardless of what it occurs between or how. This constancy, however, is self-evident. In *The Language of New Media*, Lev Manovich states that:

> "in relation to computer-based media, the concept of interactivity is a tautology … Once an object is represented in a computer, it automatically becomes interactive" (2001, p. 55).

Interaction and new media art are inseparable. Interaction must, therefore, be a key characteristic of new media art. Consequently, interaction can in a manner be considered as constituting a significant factor of the 'newness' of new media art.

The 'newness' of new media art should not, however, be understood in binary opposition with preceding forms of art or indeed media, since new media art's title does position it at the intersection of media and art. Stiles and Shanken call the 'newness' of new media the "rhetoric of 'the new'" (2000, p. 32) and state that it is part of a strategy to commercialise interactivity which is "founded on false binary oppositions" (*ibid*, p. 34) with prior media. These binary oppositions include, new media is interactive while prior media forms are passive and new media empowers an audience while prior media forms do not. As a consequence of new media's 'newness' preceding forms of media have in some cases been classified pejoratively as old (Manovich, 2001; Caldwell, 2003). The issue, therefore, is not that new media and by implication, new media art has a 'newness' to it or, as I am arguing here, that interaction contributes to that but how it in turn positions other forms of art as old. It is suggested in this research that what is old is instead termed and considered as conventional, that is that it is well-established in both practice and theoretical discussion. Furthermore, 'newness' should not be equated with improvement.[76] It is simply the most recent. At the time of their invention, "all media were once new media" (Gitelman and Pingree, 2004, p. vii), so new media art as a title only places it in the current moment. What the 'newness' of new media art does achieve successfully is when it is juxtaposed with more conventional forms of art and media it begins to rationalise the naming of new media art. It suggests that in the way interaction in new media art is conceived and the numerous ways it can be applied, interaction is at least one new or comparatively unique characteristic that was either not necessarily present or possible in more conventional art forms. Consequently, new media art can through interaction be understood as causing a significant

76 For an example of newness not being better, see Manovich's discussion on user interaction from a user's cultural perspective in 'On totalitarian interactivity (notes from the enemy of the people)' (1996).

contribution to all aspects of authorship, objecthood and spectatorship in the context of the grand-project of art in the modern era (see chapter 3.1).

It may seem unwise to delineate user-based interaction, artist-based interaction and generative interaction from each other in new media art particularly given the focus of discussion on user-based interaction by other authors. Doing so may be considered as lessening the validity of the argument that interaction constitutes the 'newness' in new media art. If interaction is considered solely as user-based interaction, then the distinction between new media art and other art forms is clearer than if interaction is classified as the four types discussed above. Interaction solely as user-based interaction in new media art is the activation of the observer as user and no other form of art preceding new media art did this in the same way. If interaction is classified in four ways, however, the distinction between new media art and some other forms of art is blurred. Cybernetic art and systems art, for example, each have examples that demonstrate one of the four interaction types. These include Ascott's *Change Paintings* (Fig. 3.1.7) (see chapter 3.1) that demonstrate user-based interaction and Haacke's *Condensation Cube* (Fig. 3.2.4) (see chapter 3.2) that demonstrates externally generated interaction.

Interaction in new media art cannot, however, only be considered user-based. Doing so would exclude two of the three artwork examples discussed above and many more artworks that have been discussed elsewhere as new media art (Tribe and Jana, 2006). Additionally, it would negate the number of art movements, developments and practitioners that have been referred to by numerous authors as having contributed to its inception (Wardrip-Fruin and Montfort, 2003; Lovink, 2005; Tribe and Jana, 2006). Not all of these art movements, developments and practitioners were focused on spectatorship. Therefore, as a continuation of these art movements in some respects but overall as contributing to the grand-project of art in the modern era (see chapter 3.1), it is unlikely that new media art's sole objective is the activation of the observer. When Manovich proposes his five principles of new media, that is numerical representation, modularity, automation, variability and transcoding, as the central argument of his proposal of new media, he purposefully omits interaction (2001). This omission is no doubt as a result of his consideration of

interactivity in new media as a tautology.[77] Manovich's omission of interactivity, however, also supports the delineation of the various types of interaction. His discussion focuses primarily on the modularity of new media and as a consequence its variability, which affects media thereby enabling interaction and creating new media. New media, in turn, facilitates new specific categories of human-system, that is user-based and artist-based, interaction and system-system, externally generated and self-generated, interaction. Therefore, Manovich's five principles of new media allow for the inclusion of non-user based paradigms of interactivity such as generated interaction even if his subsequent discussions do not discuss them in any great detail and instead focus on user-based interaction.

In the work of authors after Popper's *Art of the Electronic Age* (1993) there is a blurring of the definitions of participation and user-based interaction. These concepts are frequently discussed as levels of user-based interaction and are considered, dissected, elaborated and/or challenged. Manovich, for example, splits user-based interaction into two. The simplest type consists of branching interactivity, which he terms as closed interactivity, and a more complex type he calls open interactivity (2001, p. 40). These are in effect equivalent to what is respectively defined in *New Media: A Critical Introduction* as interaction as a means of changing the experience of a pre-existing 'text' and interaction as a “mutually reciprocal communication process” (Lister, *et al.*, 2003, pp. 40–42).[78] The stratification of user-based interaction in this way is problematic in many ways. Referring only to user-based interaction means there is a complete absence of terminology that allows for the inclusion of generative interaction. Manovich employs the terms closed and open interaction, which seem to refer to closed and open systems from systems theory, as a part of user-based interaction. However, these are not applied in a systems theory manner. Instead, they are applied with relation to narrative, the starting point of Manovich's *The Language of New Media* (2001), and the user's non-linear experience of a pre-existing narrative in the case of closed interaction or of creating

77 Manovich also states that “branching (or menu) interactivity and hypermedia can be seen as particular instances of the variability principle” (2001, p.40), that is his fourth principle of new media.

78 Additionally, interaction as a method of control of a 'text' (Lister, *et al.*, 2003, p. 41) is discussed. However, since both changing the experience of a pre-existing 'text' and interaction as a “mutually reciprocal communication process” (*ibid*) involve control, in the former the user controls their own experience of the work and in the latter the user controls the work as a system, control is considered a part of all types of user-based interaction.

their own narrative ad-hoc in the case of open interaction. A closed system in systems theory means that the system is not able to absorb or emit matter (Institute for the Study of Coherence and Emergence, 2012). In effect, it is isolated from input, and as such, this is at odds with both of Manovich's closed and open interaction, which each allow user input.

Each discussion of levels of interaction by Manovich and Lister aligns itself with communication theory's consideration of interaction, that is that “interaction is a quality present in varying degrees as a quality of communication” (Lister, *et al*., 2003, p. 49). They each occupy a position on a scale ranging from simple or low-level interaction to complex or high-level interaction. Levels of interaction have implications for new media artworks. They suggest that some artworks may offer a more diverse experience for the user than others as a consequence of a higher quantity of interactive choices, that is more narratives, more combinations of a pre-existing 'text' or the possibility of creating whole new instances of either. As such, it sets an aspirational goal for the artist. However, the goal is largely technical and omits consideration of whether that experience is qualifiably better. Additionally, closed, simple or low-level interaction may also be considered as reactive drawing into question the distinction between a reactive type of interaction in new media art and other participative art, its claim to 'newness' and whether it should be considered new media art. It is therefore suggested in this research that discussion of levels of interaction are of limited value to the discussion of new media art and its transferability to networked art in the following chapter. It is instead the presence of interaction in new media art, how it transforms the role of *observer to user*, the role of the *artist to performer* and the *artwork from object to framework*, enabling them to combine in any order that is of key significance.

3.4 Relational art: an aesthetic of relations

In the late 1990s, parallel to the development of new media art, several artists were affiliated through the writings of art writer, theorist, historian and curator Nicolas Bourriaud.[79] The publications *Relational Aesthetics* (2002) and *Postproduction: culture as screenplay: how art reprograms the world* (2005),[80] discuss Bourriaud's aesthetic theory of a relational art. The artists, including Rirkrit Tiravanija, Liam Gillick, Félix González-Torres, Pierre Huyghe, Dominique Gonzalez-Foerster, Philippe Parreno, Douglas Gordon and Vanessa Beecroft were all contemporary artists but generally unassociated with regards to medium, subject matter and nationality. This section explores relational art as the fourth and final of the selected art developments considered as a key part of the history of networked art. The exploration is principally undertaken through a discussion of the writing of Bourriaud and critical discussions of his theory. Comparisons between Bourriaud and Burnham, relational art and systems art (see chapter 3.2), are initially made as an overture to the discussion in chapter 4 of networked art practice. However, it is the relationship between strategies of relational art and new media art that are foregrounded in this section and will inform a key principle of networked art discussed in chapter 4.

According to Liam Gillick, Bourriaud's publication *Relational Aesthetics* was a response to observations of their practice through his curation of numerous group exhibitions over several years. These culminated with the exhibition Traffic at CAPC Musée d'Art Contemporain de Bordeaux — the contemporary art museum of Bordeaux, France in 1996 (2006, p. 96). Bourriaud had noticed that each of the artists practised “an art taking as its theoretical horizon the realm of human interactions and its social context, rather than the assertion of an independent and *private* symbolic space” (2002, p. 14, italics in original). In effect, that the practice of these artists contained a common theoretical basis, the concept of relationality, achieved through “the invention of situations or objects which involve human

79 Nicolas Bourriaud (b. 1965), French art writer, theorist, historian, curator and former director of the *École Nationale Supérieure des Beaux-Arts* — National Higher School of Fine Arts, Paris.

80 Both publications were initially published in French. *Relational Aesthetics* was published under the title *Esthétique Relationnelle* in 1998 and *Postproduction: Culture as screenplay: how art reprograms the world* as *Postproduction: La culture comme scénario: comment l'art reprogramme le monde contemporain* in 2004.

behaviour" (*ibid*, p. 36). Bourriaud's concept of relationality called relational aesthetics was, therefore, a manner of "judging artworks on the basis of the inter-human relations which they represent, produce or prompt" (*ibid*, p. 112).

Bourriaud describes the practice of a selection of the relational artists as follows:

> "Rirkrit Tiravanija organises a dinner in a collector's home, and leaves him all the ingredients required to make a Thai soup. Philippe Parreno invites a few people to pursue their favourite hobbies on May Day on a factory assembly line. Vanessa Beecroft dresses some twenty women in the same way, complete with a red wig, and the visitor merely gets a glimpse of them through the doorway. Maurizio Cattelan feeds rats on 'Bel paese' cheese and sells them as multiples, or exhibits recently robbed safes. In a Copenhagen square, Jes Brinch and Henrik Plenge Jacobsen install an upturned bus that causes a rival riot in the city. Christine Hill works as a check-out assistant in a supermarket, organises a weekly gym workshop in a gallery. Carsten Holler recreates the chemical formula of molecules secreted by the human brain when in love, builds an inflatable plastic yacht, and breeds chaffinches with the aim of teaching them a new song. Noritoshi Hirakawa puts a small ad in a newspaper to find a girl to take part in his show. Pierre Huyghe summons people to a casting session, makes a TV transmitter available to the public, and puts a photograph of labourers at work on view just a few yards from the building site" (*ibid*, pp. 7–8).

The breadth of practice that Bourriaud describes demonstrates the scope with which relationality can be interpreted and employed within artistic practice. The practice is multi-disciplinary and diverse. It is a combination of conceptual and performance art manifested as events and installations in galleries, public or site-specific spaces. It employs a variety of forms both created and appropriated by the artists, individually and collaboratively. Additionally, it is "not connected together by any style, theme or iconography" (*ibid*, p. 43) other than relationality itself. Stewart Martin terms it as "the subordination of 'aesthetic objects' to 'relations between people' and 'the art object' to 'artistic practice'" (2007, p. 376). The practice does, however, raise several questions including, is there anything substantially new about relational art and is the

comparison of these artists genuinely the result of Bourriaud identifying a shared aesthetic in their practice or is it solely his writing that relates them?

Figure 3.4.1: *The FOOD restaurant (Zimmer, 2016).*

Figure 3.4.2: *La Cédille Qui Sourit — The Cedilla That Smiles shop (Harren, 2012).*

At the outset, Bourriaud states that relational art ceases “to take shelter behind sixties art history” (2002, p. 7), however, this assertion is frequently contradicted throughout *Relational Aesthetics*. He refers to artists from the 1960s and early 1970s, including Stephen Willats, as forerunners of relational art (*ibid*, p. 30). He discusses Félix Guattari's ideas of art as a process of becoming. This is similar to Deleuze and Guattari's definition of philosophy as “the art of forming” (Deleuze and Guattari, 1994 cited in *ibid*, p. 96) and in turn suggests a connection with Umberto Eco's highly influential 1960s formulation of the artwork in avant-garde art as an open work (Bishop, 2007, p. 50). Bourriaud also admits that “the constitution of convivial relations has been an historical constant since the 1960s”, mentioning the Food restaurant by Gordon Matta-Clark and collaborators (Fig. 3.4.1), dinners organised by Daniel Spoerri and the ludic shop by George Brecht and Robert Filliou (Fig. 3.4.2) as examples (2002, p. 30). Given Bourriaud's contradictions, it is difficult to consider relational art as completely separated from sixties art history. Relational art is instead part of an ongoing continuum of what I have termed as the grand-project of art in the modern era; that is questioning the role of the artist, art as object, the means of its creation and the role of the observer (see chapter 3.1). Additionally, it aligns itself in several respects with discourse in the sixties and seventies that address the grand-project, in particular, Burnham's systems esthetics and art and life

as exemplified by Allan Kaprow, Fluxus and John Cage (see chapter 3.2).

There are striking similarities between systems esthetics and relational aesthetics. These range from what may be coincidental and of little consequence, yet are worth mentioning as they are not discussed elsewhere, to what is highly relevant to this discussion as the similarities demonstrate a related conceptual basis. Both developments in art employ the term aesthetic in their title although with an inconsequential slight spelling difference.[81] The use of the term aesthetic may be coincidental, however, no other development or movement in art has employed the term in its title since Aestheticism in the nineteenth century. Additionally, both systems esthetics and relational aesthetics share the characteristic of altering or subverting art history's broadly accepted understanding of the term aesthetics as a quality of beauty that is foremost located in the visual, tactile or auditory characteristics of the artwork. Named respectively by Burnham and Bourriaud who were both art writers, theorists, historians and curators, the developments were identified while they were still occurring and before the artists they discussed had identified any significant commonality amongst their practice. Burnham and Haacke developed ideas of systems aesthetics together (see chapter 3.2) while, as mentioned above, Bourriaud's development of relational aesthetics was responsive to his interaction with artists.

By identifying and naming systems esthetics and relational aesthetics Burnham and Bourriaud in a sense initiated their own development in art. Their discourse is heavily invested in them. For Burnham systems esthetics is part of nothing less than a revolution in art, a notable paradigm change similar to the morphological development of a key scientific concept (1974, p. 15). For Bourriaud relational aesthetics is “a radical upheaval of the aesthetic, cultural and political goals introduced by modem art” (Bourriaud, 2002, p. 14). Unsurprisingly Burnham and Bourriaud's writing of systems esthetics and relational aesthetics is often promotional of their ideas and the artists they discuss; at times to the point of being reminiscent of a manifesto. Initiating a development in art was highly unorthodox in Burnham's era.

81 As noted above the French title of *Relational Aesthetics* is *Esthétique Relationnelle*. The change that occurs in the translation of Bourriaud's term from esthétique to aesthetic is no doubt a result of the lead translator, Simon Pleasance, being English and Oxford-educated.

Doing so was considered a part of the role of the artist or the development was identified retrospectively by an art writer, historian or curator and typically tended to take the form of a movement that was centred on particular artists and/or at a location. However, the contemporary curator has become such a force in the art world that it is now arguable that the most significant contribution to art theory is not to be found "in art magazines but [rather] in catalogues and other material produced around galleries, art centres and exhibitions" (Gillick, 2005 cited in O'Neill, 2007, p. 14). Therefore, the role of the curator takes precedence over the role of the art writer or historian and, as demonstrated by Bourriaud, influencing and shaping the art they curate becomes their next logical step.

In *The Culture of Curating and the Curating of Culture(s)* (2012), Paul O'Neill identifies three key developments as points along a timeline of curating commencing in the post World War II era. These include what Seth Siegelaub terms the demystification of the curatorial role in the late 1960s; the curator-as-author model of the late 1980s as exemplified by Harald Szeemann,[82] Jean-Hubert Martin and Rudi Fuchs; and, in the 1990s, the consolidation of a curator-centred discourse (Thorne, 2013). Burnham and Bourriaud can respectively be seen to be representative of the first and last of these key developments. As such, it further connects them as well as systems esthetics and relational aesthetics to each other. Over the period indicated the curator has moved beyond the singular conventional role of caretaker of art to become what Harald Szeemann states is all at once "an administrator, amateur, author of introductions, librarian, manager and accountant, animator, conservator, financier, and diplomat" (Obrist, 2013, p. 34). The curator's role is "a multidimensional role that includes critique, editing, education, fundraising, etc." (Lind, 2012, pp. 11–12) and all these combined suggest that the curator may ultimately implicate themselves in the conception of art.

It is no coincidence that while Bourriaud's discourse as curator shapes what he identifies as relational art, much of that relational art is itself an art that employs curatorial techniques. This practice of *artist as curator* or *artist-curator* has a long-

82 Szeemann curated the exhibition *Live in Your Head: When Attitudes Become Form Works – Concepts – Processes – Situations – Information* in 1969, which exhibited Haacke's *«Identifikations urkunde meines Sohnes», 1.22.69* — «identification certificate of my son», 1.22.69 mentioned in chapter 3.2.

established history. It can be traced from at least the nineteenth century *Salon des Refusés* — exhibition of rejects into the twentieth century through ZERO events (Fig. 3.4.3) and Haacke's museum mix-ups demonstrated in *Viewing Matters: Upstairs* (Bird, 2004, pp. 15–18) at the Museum Boijmans Van Beuningen, Rotterdam and *Mixed Messages* (ibid, pp. 84–91) (Fig. 3.4.4) at the Serpentine Gallery, London. However, Bourriaud's curation represents the new multidimensional role of the curator by becoming a creative role of sorts akin to that of an artist. It is the *curator as artist* or *curator-artist*. Artist-curator and curator-artist are in effect similar (Groys, 2008 cited in Vandevelde, 2014, p. 2) but approached from initially diametrically opposite positions of artist or curator. Consequently, they can, therefore, have different aims and yield different results as evident in Bourriaud's curation of exhibitions, which result in his formulation of a theory of art, and relational artists communication of ideas that result in the creation of artworks.

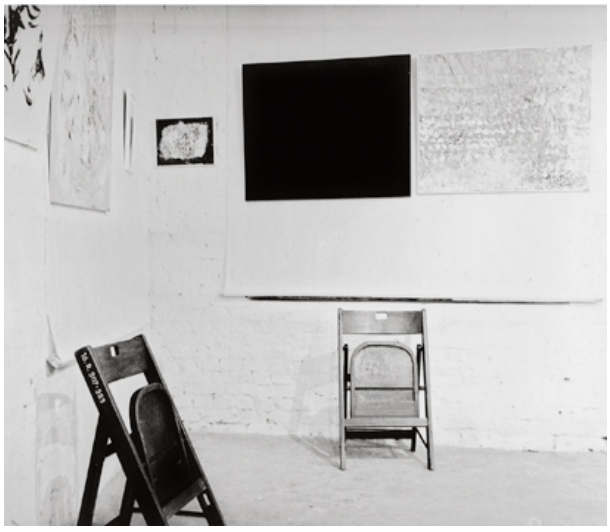

Figure 3.4.3: *The studio of Otto Piene, in Düsseldorf used for an artist-curated exhibition in 1957 (ZERO, n.d).*

Figure 3.4.4: *Mixed Messages, Serpentine Gallery (Farquharson, 2001).*

According to Bourriaud's theory, relational art is foremost and distinctly social (2002). As previously mentioned (see chapter 3.2) Haacke's third application of systems to art was and still is the exploration of *human society as a system*; that is, existing systems already identifiable as having a social function used within artistic practice. Stephen Willats, one of Bourriaud's cited forerunners of relational art, continues similar explorations of social systems in his practice to date. Additionally, Niklas

Luhmann, who wrote extensively about the sociological implications of systems theory from the 1970s onwards, ultimately applied the concept of social systems to art in the 1990s in his publication *Art as a Social System*.[83] In this Luhmann stated that art's primary function is communication and as such it has the ability for a "sociologically rooted aesthetics" (Kong, 2014). Relational art can, therefore, be understood from this social perspective to emerge from concerns that had existed in systems esthetics, that is from Haacke's *human society as a system* artworks and Willats' social artworks among others. Consequently, relational art has its origins partially in systems studies and developments in twentieth-century art such as systems esthetics. To develop this further and understand why relational aesthetics has developed the social aspects emerging from systems esthetics it is beneficial to compare relational art to new media art to understand both as parallel contrasting explorations of practice post systems esthetics.

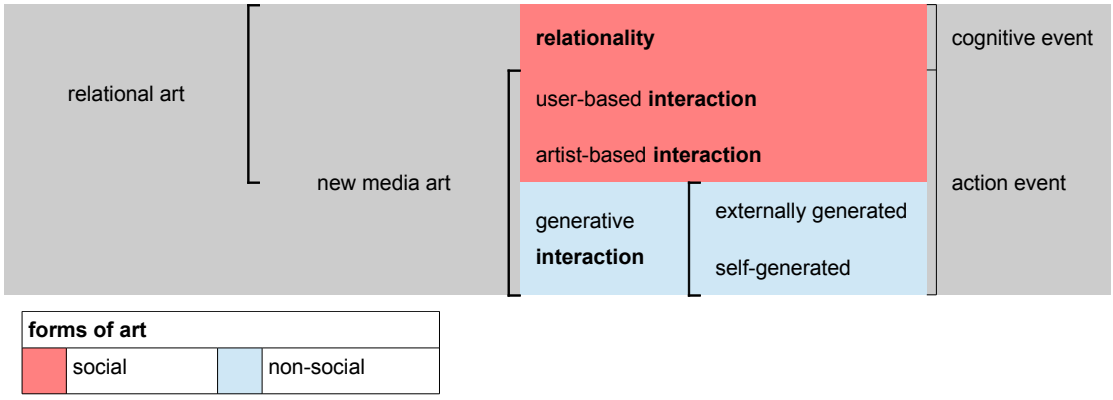

Figure 3.4.5: *How interaction and relationality map to new media art and relational art (also see Fig. 3.3.1). User-based and artist-based interaction in new media art can be included in social forms of relational art. This inclusion is indicated in the figure by new media art and relational art overlapping.*

Relationality in relational art is simultaneously similar to and distinct from interactivity in new media art. Understood as having a basis in systems studies relationality can, similar to interactivity, be user-to-user, user-to-system, system-to-system and multiple combinations thereof (see chapter 2.3). Relationality and interactivity both occur as a result of an event in the space between the parts of the artwork. That space is an

83 *Art as a Social System* was initially published in German as *Die Kunst der Gesellschaft* in 1995 and translated into English in 2000.

in-between or liminal space. Relationality is foremost a *cognitive event* while interaction is foremost an *action event*[84] (Fig. 3.4.5). In relationality, therefore, no physical connection or link is required in the space between the artwork's parts. Instead, a *representation of a connection or link in-between* the parts of the artwork is sufficient to suggest their connection. In interactivity, however, a physical connection or link is required to allow the action event, *the action that occurs in-between* the parts of the artwork. Since relational art is categorised as distinctly social what is connected must be a part of human culture or humans themselves.

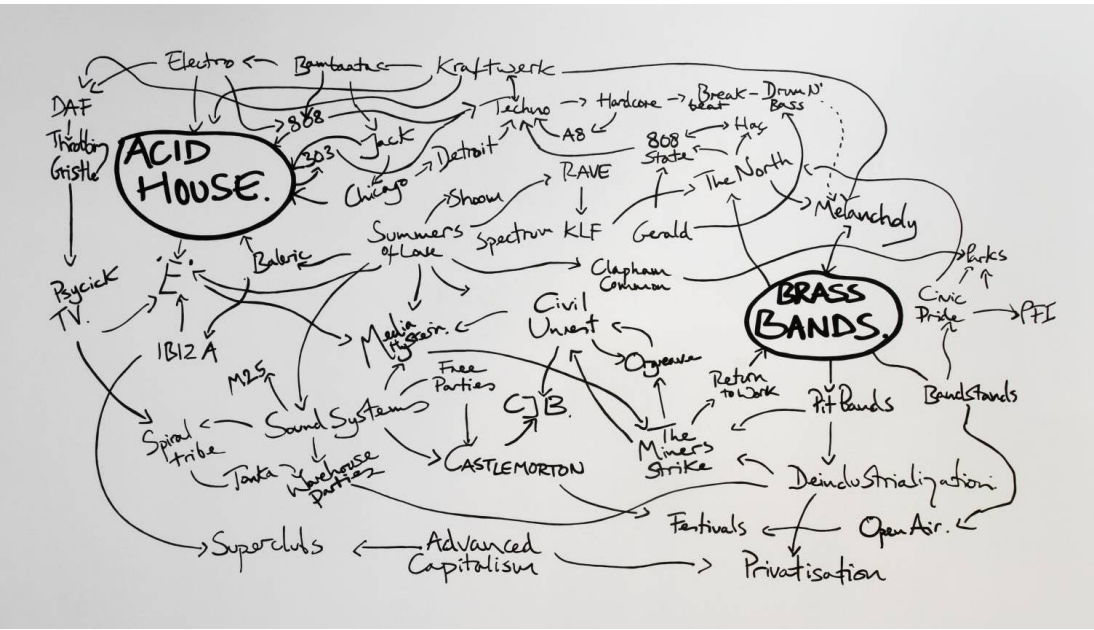

Figure 3.4.6: *The History of the World (Deller, 1997–2004).*

The History of the World (1997–2004) by Jeremy Deller (Fig. 3.4.6) provides an example of how connection is represented in relational art and that what is connected is social. By visually representing connections or links between music groups, events and places as lines in a diagram, music is communicated as a social form emerging from and responsible for developments in society. By seeing the lines in the diagram an observer cognitively makes these connections and in the process also incorporates themselves into the artwork by cognitively connecting themselves to the music of their preference, the social events they may have participated in or

84 Throughout this research, please refer to the entries for cognitive event and action event in the glossary as a quick reference.

witnessed.

As discussed in chapter 3.3, interactivity cannot be categorised as only social or what new media terms as user-based and artist-based as these types of social interaction only constitute two-thirds of the interactive paradigm. So while both relationality and interactivity are effectively concerned with connection, linking or relation, the former is exclusively social and need only represent a connection or link in-between while the latter may be social or not but must contain an action in-between. Consequently, as well as relational art incorporating relationality it must also incorporate user-based interaction and artist-based interaction since they too are social. Relational art and new media art can, therefore, be understood to overlap through their shared use of user-based interaction and artist-based interaction (Fig. 3.4.5). Yet relational art and new media art remain distinct as the former has relationality while the latter has generative interaction, which are both distinct types of events.

As a result of new media art's dependence on interactivity and its basis in action, it can be “understood to shift the ground of the artistic project away from ‘representation’ and toward ‘virtualization,’ away from ‘resemblance’ and toward ‘simulation’” (Murray, 2000) thereby transforming observer into user. If this is true, then relational art must equally be understood as reincorporating representation as a means of cognitive relation as well as allowing both observer and user as concurrent roles. While relational art can be considered as a social turn in contemporary art (Bishop, 2006 a), that is art with an emphasis on the social that can employ interaction, it notably also re-embraces cognitive events, a type of psychological interaction, which some argue new media has left by the wayside (Manovich, 2001, p. 71).

In the preface to *Postproduction: culture as screenplay: how art reprograms the world*, Bourriaud states that his discussion of relational art in *Relational Aesthetics* was simply “a 'kick start' to contemporary aesthetics, beyond the fascination with communication and new technologies then being talked about incessantly” (2005, pp. 7–8), alluding to the then emerging new media art. Furthermore, Bourriaud also admits that referencing and remixing, the subject of *Postproduction*, are not new. As

is clear from the discussion above, relational art and new media art both move the discussion of systems studies in art forward from systems esthetics in different ways. Since systems esthetics, capitalist systems of commodities and economics, the systems that systems studies became the science of, have subjugated human existence (Stewart, 2007, pp. 376–378). New media art's systems have become ever-increasingly technology-based or mediated and as such could be said to support capitalist systems of commodities and economics as neo-liberal ideals (Cameron, 2008). Relational art's systems, however, being socially focused all but revert to a pre-systems studies state, that is prior to the technologies systems studies led to, and relational art “restores the world to us as an experience to be lived” (Bourriaud, 2005, p. 26).

In his 'Critique of Relational Aesthetics' Stewart Martin asks whether the social in relational art is a yearning for human relations, the “experience of a different time” (2007, p. 378) now predominantly passed, as a consequence of capitalist systems of commodities and economics subjugating human existence. Indeed, viewed from this perspective Bourriaud's discussion of relationality does seem to be retrograde. According to Bourriaud, however, 'newness' was never a consideration in his discussion of relational art. Anthony Downey suggests that relational art is not about what is said, that is, any 'newness' in concept or form, but how it is said (2007, p. 268). The artist's unique combination of concept and form is akin to style and intonation in spoken language. Additionally, it can also be suggested that the context within which something is said is equally of key importance.

Bourriaud points out numerous times that relational art is being conceived in an era of the net. However, this point is never more apparent than in a salon discussion with Edward Shanken at Art Basel:

> “The arrival of the network culture at the beginning of the 1990s produced two main effects on the arts. The first being the insistence on connectivity, connectivity as a way to communicate in a different way, to produce social situations that would not have been really thought the same way before and we see today the inter-human sphere is really a capital crucial part of all the internet industry … and the second one I

> think is the format of the screen, I do really believe that today the screen has become the main, let's say frame, through which we see the world" (2010).

Bourriaud states this sometime after his initial discussions of relational art, yet there is a genuine and enthusiastic acceptance of technology, in particular networks, and their effects on art. Networks are a product of the world we live in, which could not be possible without systems studies. This research, therefore, proposes that relational art cannot be considered to be retrograde. It is in actuality a development in art that has realised that networks have preceded the Information Age and while now foregrounded by the Information Age, will continue to exist beyond its time. As such, relational art has moved beyond a fetishisation of the electronic and digital technologies associated with networks to have a longer view. The view has also emerged as part of post-internet art in the first decade of the 2000s and it is equally adopted by this research (see chapter 2.1). Relational art's view may be mistaken for being retrograde because it simply does not articulate it in the language of current specific technologies.

If anything it is the *context of the network*, articulated by many in different ways including Bruno Latour's "networks thrown over spaces" (1993 cited in Stalder, 2006, p. 186) and Manuel Castells' network society (Stalder, 2006), that constitutes 'newness' in relational art. Bourriaud has remarked in recent years that "everything is an object, from beings to matter" (Frazier, 2014, p. 96). If everything can be considered as an object, everything can be a potential component of relationality, essentially a node in a network. This view may suggest a new wider definition of relationality on the part of Bourriaud that moves away from the solely social to incorporate the non-social, or as new media considers it that which is not user-based and has recently led to developments such as the internet of things. Regardless of this what is certain is that Bourriaud does without a doubt connect artists, subject matter and objects through his writing. While this may be the only thing that initially unites them it is validated as it is part and parcel of the new ability of the curator-artist.

Chapter 4: A framework of networked art

Introduction

In this chapter, I will outline a framework for networked art that builds on the synthesis of discussions in the preceding chapters. In this way, networked art will be described in relation to the history of networks (see chapter 2) as well as positioned in relation to discussed art developments (see chapter 3). The purpose of the framework is to provide a structure that can be applied by an artist within contemporary art practice that is neither conceptually restrictive in how they carry out their practice nor prescriptive regarding their choice of subject, media, form or platform. Additionally, it provides a means of explaining networked art that does not rely on specific technology, subject, media, form or platform. The research method employed in this chapter is principally practice as research and the practice is discussed as case studies of networked art that apply the framework. Historical research and field research are also employed where necessary, including literature searches, reviews of relevant academic publications, journal articles, conference proceedings and visits to exhibitions. However, discussion will principally link research discussed in chapters 2 and 3 and, combined with experience drawn from my practice as research, draw conclusions as to how the framework should be constructed. As such, the chapter addresses the question of what networked art consists of as well as how it operates and starts to formulate a response to the question of how contemporary art practice can engage with technology and yet not be defined by technology (see chapter 1.1).

The framework is broken down into four key principles. These should not be confused with the framework's parts, of which there are also four. The principles are the qualities of a networked artwork that enable it to be considered as networked and distinguish it from other types of art. The framework's parts, however, are the minimum number of components that a networked artwork can be composed of. Each principle will be discussed as a section in this chapter and builds on discussions in chapter 2. For example, chapter 4.1, Nodes (& links), will discuss the framework's parts as the first key principle and how they relate to mechanistic, effectively technological or human-made, and organismic distinctions from early systems studies (see chapter 2.2). Chapter 4.2, Arrangement, and chapter 4.3, Behaviour, will discuss processes as the second and third principles of the

framework and how they relate to specific emphasis of cybernetics and systems theory within systems studies (see chapter 2.3). Finally, chapter 4.4, Space (& time), will discuss spatio-temporal qualities of the framework as its fourth principle and how these relate to the visual and functional pre-history of networks (see chapter 2.1). Over the course of the four sections, the role networked art's parts perform will, in turn, be explained and what they enable within a networked artwork.

The principles will initially be outlined abstractly to explain each and therein the framework as applicable to a selection of artworks, their methods, site and context, that may otherwise be argued to be discipline specific. Each section will conclude with the introduction of an example of my artwork as practice as research. In addition to actioning and testing aspects of the framework as it is developed my practice also serves as a case study of networked art that is operational in full awareness of the framework. My practice will be employed as a means to demonstrate the framework's principles in action as well as how the artwork has specifically employed the framework's parts within the artwork's conception thereby grounding the framework in practice. The mapping of each artwork to a section is not specific as all four principles are required within each artwork for it to qualify as networked art. Instead, the order of mapping has been selected to provide the most coherent demonstration of a principle and parts discussed in the section.

The strategy of division of the framework for discussion, rather than a discussion of the framework as a whole, is being employed to communicate the role of each principle clearly and to steadily build an explanation of the framework. The strategy is not intended to be reductive, that is the framework is not required to be reduced to its parts to understand it. Instead, the strategy is to reinforce the concept of the framework as a structure or model and that the combination of principles and parts compose a whole that is more than the sum of its parts, similar to von Bertalanffy's theory of 'wholes' (see chapter 2.2). Additionally, the strategy is intended to reflect the form of networked art and its processes. The relationship of the framework's parts discussed within each section can in a manner be viewed as hierarchical. For example, parts discussed in the first section are required for the existence of a part, and indeed aspects of principles, discussed in following sections, however, it is the combination of all of the framework's parts and their interdependency that enables a

networked artwork to function as an integrated whole.

The framework of networked art should itself be understood from the outset as a network. It will be visualised throughout the chapter as a modelled structure in diagrams directly embedded in the writing. Additionally, an interactive animated model, referred to hereafter in references as the model, is provided online[85] to accompany the written component of the research. The structure diagrammed is modified and updated periodically throughout the chapter while the model is animated step-by-step along a timeline that is referred to at various points in the text. Both types of diagrams steadily build a complete picture of the framework as both a conceptual model and an abstracted example of a networked artwork throughout the chapter.

As discussed in chapter 2, networks have shifted from a visual basis pre-systems studies to having a functional basis post-systems studies. Consequently, the implication is that currently, networks are non-visual or often cannot be satisfactorily visualised. As such, this questions the rationale for visualising a proposed framework as a network conceived post-systems studies. The diagrams in this research, however, take as their foundation, theoretical discourse concerning the image as representation and in particular Deleuze and Guattari's proposal of a diagram's purpose as being “not to denote or to image the morphemes of an already-constituted referent, but to produce them” (1979 cited in Watson, 2009, p. 12). Effectively for Deleuze and Guattari, diagrams are a map or a plan employed to create with rather than an image that represents what has already been created. This concept of diagrams is incorporated into their conception of the rhizome (see chapter 2.2) and is considered as the bridge between the systems studies concept of a system (Smith and Protevi, 2013) and network concepts. Deleuze and Guattari's proposal of a diagram as a plan is applied to the use of diagrams as fundamental to the conception of the framework. As a consequence, the framework itself is considered a network as diagram. This means that the diagrams and model not only illustrate concepts but form the basis of their conception, much as maps can be employed as plans (see chapter 2.1), manifested as writing as well as artworks

85 The interactive animated model is available at this URL: http://www.asquare.org/framework/

produced. In this manner, they refer to practitioners such as Stephen Willats (see chapter 3.2) who have employed diagrams in similar ways. A unique relationship is formed between the diagrams/model and writing/practice, which must consequently be viewed together. In addition, the framework as a theory of practice that is a network as diagram can be considered comparable to Castells theory of networks, which is itself a network (see chapter 2.2).

Before progressing to the discussion of the framework's principles and parts, it is important to recap and be clear on the key points noted from the first two chapters as these will be taken as given in the conception of the framework. These include:

- In the twenty-first century, we now live in an era of pervasive networks.
    - Network is a term embodied primarily through technology as a human practice, of which the internet is the most notable. However, the term can be retrospectively applied to understand phenomena in the pre-history of technological networks (see chapter 2.1).
    - Networks have in part visual origins and as such are applied in symbolic, abstract and representational ways (see chapter 2.1).
    - A network is a type of system and how it has developed owes a significant debt to systems studies (see chapter 2.2).
    - There is a distinction between cybernetics and systems theory; for the former, networks can be merely possible (Deleuze, 1991, pp. 96–98) while for the latter, only networks that are concrete, or materially existing, are addressed. The opposition of possible and material should not be confused with the distinction between 'virtual' and 'real', which both exist (see chapter 2.3).
- Within what I have termed as the grand-project of art in the modern era there are five general occurrences that affect the practice of art.
    1. The role of the artist has diversified from creator to include organiser and curator (see chapter 3.4).

2. Art practice has occurred through many media, forms and platforms from the modern era through to contemporary art, which questions the conventional concept of the art form as an object fixed in space and time (see chapter 3.1 and 3.2).

3. A reconceptualisation of art as object to art as system or framework has occurred, which is not bound by terms such as 'real' and 'virtual', enabling it to develop beyond the artist's original production and exist in multiple spaces and times (see chapter 3.1 and 3.2).

4. There has been a shift in spectatorship from observer or audience to participant and user in contemporary art, which parallels the shift in science from observer to participant (see chapter 3.1 – 3.4).

5. Technology has been employed in contemporary art as a means in part to address the changes in the role of the artist, art form and spectatorship (see chapter 3.1 – 3.3).

> “what a node is, concretely speaking, depends on the kind of concrete network of which we speak” (Castells, 2000, p. 501).

4.1 Nodes (& links)

A network is constructed of nodes and links. This section discusses nodes as the first of the four key principles of the framework of networked art. To understand what nodes and links in a network may be and how they relate to each other I shall start with a simple metaphor that serves as a useful introduction and then develop it into an example. If a network is to be visualised as a net or mesh of points connected by lines, and as discussed in chapter 2.1 networks frequently have visual origins, then nodes are the points and links are the lines. Consider a country's electrical network as an example of this. Nodes in the electrical network are the power stations and generators. These could be considered its primary nodes while its secondary nodes are its pylons. Geographically close together the pylons assist in bridging the space between the primary nodes which are geographically much further apart. Electrical cables are the links in such a network. High powered cross-country tension lines are primary links, lower-powered urban electrical lines are secondary links, domestic wiring are tertiary links and so forth.

While some claim the importance of either nodes or links over the other, Latour (1993 cited in Stalder, 2006, p. 186) and Musso (2003 cited in Stalder, 2006, p. 178) for example state a network is connected lines, both must be understood as being codependent and should, within the context of the framework, be considered of equal importance. As Latour argues, without links there is no structure to a network (*ibid*), nodes are isolated and do not form part of a network. However, equally without nodes, there is nothing to link together and so no reason for links to exist. Stalder sums up the co-dependency between nodes and their links, which he terms as relationships when he states “a network is defined simultaneously by its nodes and the relationships among them. The whole makes the parts and the parts make the whole” (2006, p. 177). Nodes, therefore, are proposed as all four of the framework's parts and as the first of the four key principles of a network mentioned in the

introduction to this chapter. When nodes link with each other their place and role are established in a network in much the same way that networks as symbolic visual representation establish a human's place in the universe (see chapter 2.1). The combination of nodes qualifies as a network and defines what the network does.

With regard to systems studies, a key foundation of the framework, node is employed as a generic term for the framework's parts. Node is a synonym for, but also in preference to, a variety of terms. Several of these have already been mentioned in chapters 2 and 3. They include part (*ibid*), component (Urry, 2002), element (Musso, 2006 cited in Stalder, 2006, p. 178) and actor (Podolny and Page, 1998; Castells, 2000; Latour, 2007). While all the terms have the same definition of parts of a whole, each suggests what those parts may be or, referring broadly to mechanistic, technological or human-made and organismic distinctions (see chapter 2.2), what their origins are. Part and component, for example, suggest that they comprise non-living wholes or aspects of mechanisms and so can be understood as following in the tradition of cybernetics. Element suggests basic natural forces or substances yet with the potential to be active or reactive, for example, erosion as a result of a natural force such as rain and wind or the chemical reactions of natural substances on each other. Actor suggests a complexly animated and importantly cognitive part such as a person with the ability to act based on motivation or react based on knowledge.

As a result of these suggestive meanings, node has been chosen as the most appropriate term. It is already employed across a wide range of scientific fields such as biology, botany, physics, mathematics, geometry, astronomy and computer science, which allow it to encompass many possible types of part that are mechanistic, technological or organismic (see chapter 2.2) and not specific to any one field or discipline. Additionally, in all disciplines, nodes are particularly suggestive of knots in a mesh or disruptions on a surface. This suggestiveness is deemed appropriate to the framework given discussions of the visualness of networks and their fabric-like resemblance (see chapter 2.1). The term node may be interpreted as negative when it is applied to that which can be complexly animated and is, most importantly, cognitive; that is when an individual is referred to as a node. This point is acknowledged from the outset of the discussion of the framework. However, it will temporarily be put aside to be discussed later in this section so that

firstly nodes can be explained. Links or connections are employed almost universally as the term for the lines within the mesh of a network. I have chosen to use links, once again because of their suggestive relation to meshes and fabric. However, in the post-information (Negroponte, 1995), networked society (Castells, 2000) and hyperconnected age (Vitale, 2014) it is equally the term most likely to be associated with the internet's hyperlink and as such evokes qualities of a similar nature in networks as a whole.

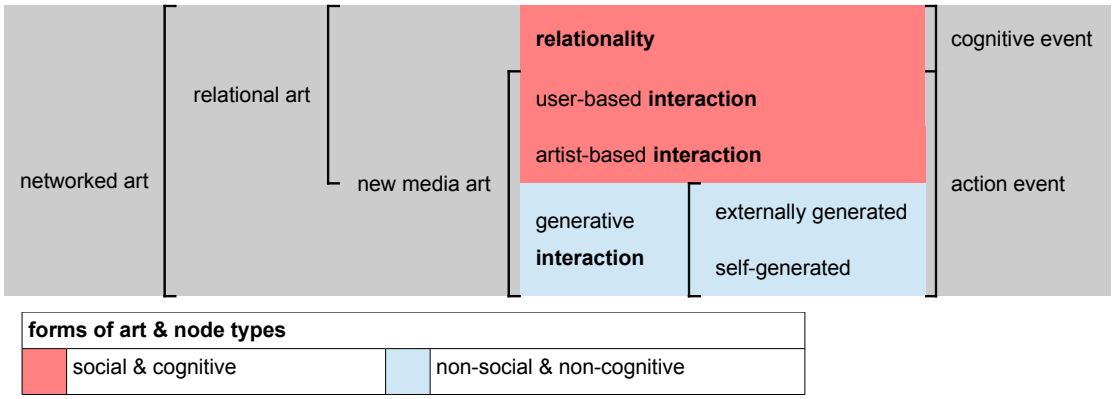

Figure 4.1.1: *The coincidence of social or non-social forms of art with nodes that are cognitive or non-cognitive. Networked art maps across both forms of art and node types. As such can be considered to incorporate aspects of new media art and relational art, notably their action and cognitive events.*

Nodes of networked art fall into two general categories, those that are either *cognitive* or *non-cognitive*. As the basis of these two categories, the framework refers directly to the two categories of social and non-social with regards to discussions of interaction and relationality within new media art and relational art respectively (see chapters 3.3 and 3.4). Within networked art, a cognitive node coincides with what is social, and a non-cognitive node coincides with what is non-social. Additionally, networked art incorporates both relational art's concept of relationality as foremost a cognitive event and new media art's concept of interaction as foremost an action event. Figure 4.1.1, updated from Figure 3.4.5, illustrates this within the context of networked art. A cognitive and social node in networked art is defined as being a part of human culture. It is effectively an individual that is one of networked art's nodes. A non-cognitive and non-social node is a product of human culture or not a product of human culture, that is it is produced by human culture or

produced by nature. In either of these circumstances, the non-cognitive or non-social node can be either a part of human culture's social processes or not. It follows then that only a cognitive node can carry out a cognitive event such as relationality (Bourriaud, 2002), that is cognitively linking other nodes within an artwork as a result of its knowledge. Any cognitive or non-cognitive node, however, can carry out an action event, provided of course that they have some means of animation to initiate action for the event. Therefore, nodes within networked art are essentially either cognitive and social or non-cognitive and non-social, that is human or not human.

A list of five node types in networked art is outlined in Figure 4.1.2. These can be understood as representing the typical parts of a networked artwork while the sixth and final node type, an emergent property of these nodes, will be discussed separately in chapter 4.3. Figure 4.1.2 maps the categories of cognitive and non-cognitive nodes, how social and non-social coincide with the categories and finally where examples of node types fall under each category. It should be noted that while cognitive and non-cognitive nodes coincide with what is social and non-social respectively, social and non-social are indicated as sub-categories in Figure 4.1.2. This positioning in the figure is a result of the potential addition of a non-social sub-category under cognitive, that would typically consist of animals. Many of the acts of animals would enable them to be considered as cognitive, however, they would not be part of the social within the context of art because it is considered a uniquely human practice (see chapter 2.1). Since the framework proposed relates only to art this non-social sub-category of cognitive is omitted and will not be discussed in this research. Additionally, the coincidence of what is cognitive or non-cognitive with social or non-social forms of art is not fixed and immutable. This coincidence will no doubt change at some point in the future as artificial forms that are capable of cognition are developed. At present, however, discussion of this scenario is speculative, lies within the field of futurology rather than art theory and is not relevant to the discussion of the framework as a means to address current developments in art.

As can be seen from Figure 4.1.2 cognitive nodes, social nodes or essentially individuals can be split into three types. In discussions in chapters 3.3 and 3.4 the first two types were termed observer if their involvement with the artwork was only

cognitive, as is the case with relational artworks such as *The History of the World* (1997–2004) (Fig. 3.4.6) by Jeremy Deller, and user if their involvement was active, as in the interaction that occurs in new media art such as *[V]ote-Auction* (2000) (Fig. 3.3.3) by Ubermorgen. The third type of cognitive node is artist. All three types of cognitive nodes are roles assumed by one or more individuals that define modes of involvement in the artwork, that is they affect and are affected by the artwork. Consequently, they correspond with Backlund's definition of nodes within a system (see chapter 2.3). The three types of cognitive nodes are operationally distinct, form the basis of two of the four issues discussed in chapter 3 and are repeatedly referred to since as what I have termed as the grand-project of art in the modern era; that is the role of the artist, art as object, the means of its creation and the role of the observer (see chapter 3.1).

	node category		node type
node	cognitive	social	observer
			user
			artist
	non-cognitive	non-social	nodes that are a part of the artwork
			nodes that are versions or copies of production that are a part of the artwork

Figure 4.1.2: *The first five node types possible in networked art.*

The terms observer and user are employed in the framework of networked art to create continuity between relational art, new media art and networked art. While discussions of the observer have a long tradition in art, one example is of an observer's Psychical Distance (Bullough, 1912), user is a relatively new term. Some critics have argued in the context of art and elsewhere that user suggests being engaged in the act of a purely physical action for utilitarian purposes and as such is problematic (Norman, 2006; Norman, 2008; Adams, 2014). Adopting it in networked art may, therefore, cause some issues. The role of a user in networked art is not,

however, purely physical. Their interaction is foremost an action event, but it does not preclude the occurrence of a cognitive event (see chapter 3). In fact, interacting with something for a purpose suggests that a user has prior intent or motivation, which requires cognition on their part. Information in digital formats is for example increasingly interacted with to learn. In this example of the process of motivation to learn, a cognitive event informs the action event of interacting that subsequently informs cognitive events. A user's role consequently employs both action and cognitive events.

User is, therefore, an appropriate description of an individual's role in a networked artwork that employs interaction as it suitably highlights their action event and incorporates their cognitive event within the artwork. The issue of user indicating a utilitarian purpose of what is being used is exasperated in the case of any art that situates itself within utilitarian contexts. Much of new media art situates itself in relation to interactive media and therefore has this issue. As a result, this issue carries across to networked art. Art's function, however, is more than just utilitarian and this is repeatedly discussed in art theory. Niklas Luhmann, for example, argues that art functions as a socially communicative form (2000). User is also often associated with negative meaning such as a drug user (Adams, 2014). To use something in a general sense does not define whether what is being used has either a positive or negative function. Negative meanings can only be implied or inferred within the broader context of a complete statement in language or the specific scenario of use of an artwork in contemporary art.

In networked art observer and user as roles are not, as they may have seemed to be in some preceding forms of contemporary art,[86] opposites or exclusive in their processes and their relation to the artwork. Observer and user are integrally linked and are as nodes of a networked artwork inside or within the artwork, similar to the observer (or experimenter) being within and therefore a participant of a system in systems studies (see chapter 2.3). Participatory and interactive art forms, for example, have already demonstrated links between the two roles of observer and user (see chapter 3). When Manovich states in relation to new media that “once an

86 See the discussion in chapter 3.3 concerning observers as passive and users as active.

object is represented in a computer, it automatically becomes interactive" (2001, p. 55) it is also implied that the representation of that object requires observation on the part of the user before they can use the object. Equally, when the Relational artist Rirkrit Tiravanija creates his food event artworks he allows observation of the artwork performed, the artist cooking, serving food and others eating it, as well as allowing people to interact on many levels such as eating, combining or adding to the food and socialising with others. As such, any art form that is participatory or interactive, that is employs use as part of its appreciation, requires observation. In networked art, this means that an action event is preceded by the occurrence of a cognitive event. However, it should be noted that a cognitive event can be influenced by one or more prior action events.

Jean-Louis Weissberg's coined term spectactor (Amato and Weissberg, 2003) addresses this scenario by combining spectator and actor, effectively alternative terms for observer and user.[87] The actor component of spectactor avoids the negative connotations some have argued that user embodies (Norman, 2006; Norman, 2008; Adams, 2014). Weissberg's point of departure is the change in imagery primarily brought about as a result of technology, such as screen-based imagery becoming an interface, the change this causes in media and the resulting transition of observer or spectator to user or actor. The point made by Weissberg's term is equally applicable to networked art. In networked art, individuals can assume the role of observer, user or transition from one to the other in any order. As observers of networked artworks, they cognitively make links between nodes to appreciate an artwork. As users of networked artworks, they actively make links between nodes by interacting with an artwork to appreciate it. An artwork is as a result considered to be networked art if it allows any combination of cognitive or action-based events linking nodes and is conceived to do so. In addition to users developing their own experience of an artwork, either cognitively or actively, a user's action event on an artwork can potentially develop the artwork for the experience of subsequent users. As such, a user must be understood as having authorial qualities. However, since a user's action event occurs with nodes already within a networked

87 Weissberg's term spectactor (Amato and Weissberg, 2003) is distinct from Augusto Boal's term spect-actor. Weissberg refers to combining the roles of spectator and actor in new media contexts while Boal, coining his term in the 1960s, refers to combining spectator and actor within theatrical contexts. Boal's term is conceived before technological networks existed. However, there is evidence of it having influenced thinking within new media (Wardrip-Fruin Montfort, 2003).

artwork the role of user, similar to the role of observer, can only occur after the artist has conceived of the artwork. As a result of the close connection between the roles of observer and user they are integrally linked, each informing the other in cycles similar to Kirsh's feedback loop or decision cycle model (n.d.) (see chapter 2.3). Consequently, they are consolidated as *observer–user*[88] in the framework (Fig. 4.1.3).

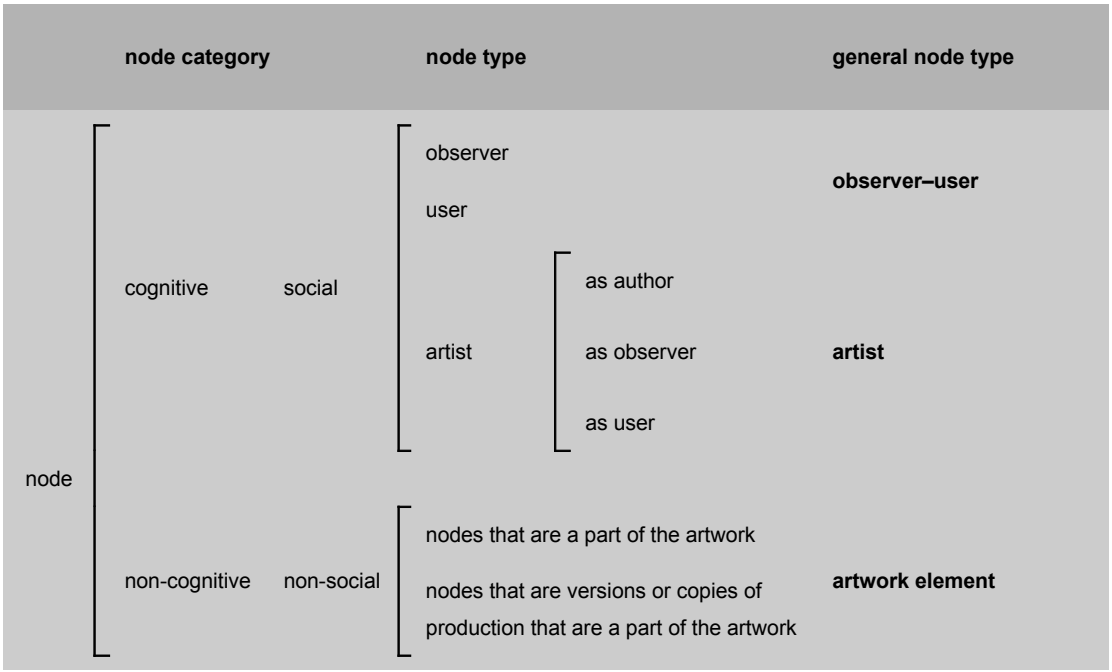

Figure 4.1.3: *The roles of observer and user consolidated as observer–user. The three roles of the artist and the two types of non-cognitive nodes as artwork element.*

I now return to the point mentioned above that humans, that which is cognitive and social, categorised under the generic term of nodes may be problematic. It suggested that while a network gains from the addition of each node, for observers, users or artists as individuals there may be a loss of identity. Node as a term is as appropriate as user. It describes its purpose within a network; the point of intersection of its lines or links, which may produce a knot-like appearance in the network. Additionally, node is purposefully unspecific as to what it may precisely constitute and as such is equally applicable to that which is cognitive or non-

88 Throughout this research, please refer to the entries for observer and user in the glossary as a quick reference.

cognitive. When discussing an individual's relation to a network as a whole, node, therefore, defines the individual as a point of intersection potentially as equal as all other types of nodes. However, this does not suggest that all nodes in a network are in actuality equal[89] but rather that there is the possibility for them to have the same links, which would potentially make them equal. Each node's capabilities or what they contribute to the network as a whole creates inequalities of varying types.

As well as the observer–user in networked art being a type of cognitive and social node and a role assumed by one or more individuals, so too is the artist. The role of the artist can be split into three separate roles, which can be kept distinct, merged or occur in iterative cycles (Fig. 4.1.3). The first is the artist as author. It is, in essence, the conventional role of the artist as the individual who conceives of the artwork. The process of conceiving an artwork will be discussed in more detail in chapter 4.2. However, for the time being, its occurrence should be understood as mandatory for there to be an artwork, as occurring before anything else occurs in a networked artwork and occurring foremost through one or more action events. Since the artist is a cognitive and social node, conception incorporates a cognitive event or events. A networked artwork that may be primarily conceptual is possible. However, the actual conception of an artwork must occur through an action event. In order for an artwork to be manifested and communicated to an observer–user something more than a cognitive event, effectively action of some sort, must occur. Without it, the artwork is not brought into existence. Networked art, 'real' or 'virtual', is after all art that exists and as such comparable to the consideration of networks in systems theory rather than cybernetics (see chapter 2.3). Therefore, networked art proposes that conceptual is not a synonym of 'virtual' and should not be considered as the opposite of objecthood in art. Instead, cognitive and action events should be considered as analogous to thinking and doing, and it is in these definitions where any consideration of opposition if it exists, should be discussed.

The second and third of the artist's roles are the artist as observer and the artist as user. Both of these are comparable to the roles of observer and user within the

89 Metcalfe's law, for example, states that the value of a network is proportional to the square of the number of its nodes, that is n(n − 1) / 2 where node is n, and assumes that all nodes and links are equal. However, this theory has been suggested as potentially problematic in several ways (Odlyzko and Tilly, 2005; Briscoe, Odlyzko and Tilly, 2006; Van Hove, 2014).

framework and occur after the conception of the artwork. The artist as observer and the artist as user have, however, additional insight into an artwork as a result of the artist initially being the artist as author. Consequently, all three ways in which the artist's role occurs, that is the artist as author, the artist as observer and artist as user, are less concerned with interpreting the artwork, which forms the motivation of the observer–user, and are more focused on the artwork's conception and presentation. Specifically, the artist as author conceives of the artwork, the artist as user performs with the artwork by using it, presenting it and developing it for subsequent observer–users while the artist as observer informs subsequent versions of the artwork or other artworks that may be created by the artist. These three integrated roles of the networked artist are not unique to networked art. They exist in many other types of art including new media art and relational art. However, the networked artist's ability to occupy and transition across roles is integral to its practice and the manner in which it is defined, that is as itself networked, and this is unique to networked art. It is distinguished from practices where occupying and transitioning between roles may be considered multi/inter-disciplinary and thereby in a sense places the artist in a type of no man's land outside or between disciplines and their histories.

Non-cognitive or non-social nodes can be split into two types as indicated in Figure 4.1.3. They include firstly nodes within the artwork that are a *part of the artwork*, for example, anything 'real' or 'virtual' ranging from a concept through a media form to object. Secondly, they include nodes that are v*ersions or copies of production* conceived for the artwork which cumulatively act together to form the artwork, for example, any tests of concept or technique, plans, sketches, models, maquettes, prototypes, demonstration examples and variations. Non-cognitive nodes employ action events with each other but not cognitive events. Consequently, they, like cognitive nodes, correspond with Backlund's definition of nodes within a system (see chapter 2.3) because they can affect and be affected by the artwork. For a cognitive event to occur, there must be a cognitive node, that is an observer–user or artist. Cognition occurs on the part of the cognitive node and not the non-cognitive node. Non-cognitive nodes that are a *part of the artwork* are unique. They are parts of the artwork as a whole, which when isolated have no meaning on their own within the context of art. Non-cognitive nodes that are *versions or copies of production*,

however, are wholes in their own right that may have meaning in isolation but which is added to when within the context of the artwork and thereby the context of art. The difference between the two nodes types is, therefore, a matter of cohesive integrity of the artwork.

All cognitive and non-cognitive nodes are part of the artwork as a network and can also be parts of networks external to the artwork. For example, an artwork's node can be part of a network such as the internet. Nodes that are parts of networks external to the artwork create what initially seems like a paradox. It is both a node of a networked artwork and a node of another network, whether that is another networked artwork or otherwise. To explain, the example of a country's electrical network discussed above can be developed further. A networked artwork that employs electricity, such as an artwork that is computer-based, is, for example, a network that has electricity as one of its nodes. As outlined above the electrical network is, however, also a network in its own right that is external to the context of art and has nodes of power stations, generators and pylons. The electrical network, therefore, has a dual identity of a node within the artwork and network without or outside the artwork. Similarly, if the artwork affects the electrical network, then it too can be considered a node of the electrical network yet simultaneously remains a network without the electrical network. This artwork and electrical network example is not unusual, an observer–user is both a node within an artwork and part of a network, such as biological, social and so forth, without an artwork. Since both cognitive and non-cognitive types of nodes can be part of a networked artwork and part of a network external to the artwork, a networked artwork must be considered to more often than not be an open network (see chapter 2.3).

With all this considered, the five node types that form the basis of networked art, that is observer, user and artist as cognitive nodes and part of the artwork, version or copy of the artwork as non-cognitive nodes, can be reduced to three general types of nodes. These are *observer–user* as a consolidation of observer and user, *artist* incorporating the three artist's roles and *artwork element*[90] encapsulating the two non-cognitive node types (Fig. 4.1.3). While the choice of observer–user and artist

90 Throughout this research, please refer to the entry for artwork element in the glossary as a quick reference.

as terms have either been explained or are self-evident, the choice of artwork element may be unclear. The list of alternative node terms outlined at the start of this section gives four possible terms that are descriptive of parts. The term part itself, component, element and actor. The term actor cannot be employed as it suggests a cognitive node. Part and component are too reminiscent of mechanisms and as such too specific of a type of non-cognitive node. Element, however, which refers to Musso's terminology for a node (2006 cited in Stalder, 2006, p. 178), is chosen because its suggestion of basic natural forces or substances with the potential to be active or reactive is inclusive enough to encompass all types of non-cognitive nodes yet excludes cognitive nodes. All three general types of nodes are illustrated under the column general node type in Fig. 4.1.3.

I now return to two points briefly discussed above concerning the equality of nodes in a network and what each brings to the network as a whole. These two points form part of three interwoven issues that require further discussion; the individual identity of nodes, equality of nodes and hierarchy in a network. An ideal pervades network studies that perfect networks are non-hierarchical. Deleuze and Guattari, for example, describe the rhizome as:

> “an acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automaton, defined solely by a circulation of states” (2004, p. 23).

It is evident from Deleuze and Guattari's description of the rhizome (see chapter 2.2) as non-hierarchical that it cannot be an object or structure. I would add that it also cannot be an existing network; it is instead a possible and arguably idealistic network. To be non-hierarchical a network's nodes must all be equal, that is they must have equal links within the network and so have an equal identity. However, a network with all equal nodes would not need new nodes as they would not contribute anything new to the network other than add to its overall mass. A new node would not affect the network, that is it would not enable new links. In the example mentioned above of artwork that has an electrical network as one of its nodes or artwork that is one of the electrical network's nodes, all action events by the electrical network would be the same and act on the artwork in the same way. Equally, the artwork would always act on the electrical network in the same way the electrical

network acted on it. If the nodes were observer–users that were all equal, each would act within the artwork identically.

A node's identity within a network is understood to be formed in relation to the network as a whole. Furthermore, the network as a whole is a collection of “nodes and their relationships” (Stalder, 2006, p. 177) so it follows that a node's identity is formed by its relationship to other nodes. Castells supports this concept of identity formation when he states that “a network is an enduring pattern of interaction among heterogeneous actors that define one another” (2000, p. 180). Therefore, upon becoming a node in a network, a node undergoes an identity formation as a result of its juxtaposition to other nodes. The node may bring some of its pre-existing identity to the network, its identity may be modified or formed anew by other nodes, or it may be a combination of these factors. Regardless, otherness or the juxtaposition of the Other is formative for a node and results in a unique identity that contributes to the network. Inequality, and thereby hierarchy, can as a consequence be understood as a quality of existing, whether 'real' or 'virtual', networks while equality and non-hierarchy can be understood as an ideal only existing within possible networks. Networked art as an existing network can never have nodes that are all equal. It can, for example, be safely assumed that users as nodes would each act within an artwork with varying degrees of difference thereby demonstrating their own unique identity.

Existing networks, therefore, require inequality. Pierre Musso terms this an “unstable structure of connections” (2003 cited in Stalder, 2006, p. 178). Both Castells and Musso variously describe nodes that are added to and removed from a network based on what they do or don't contribute (Castells, 2001 cited in Stalder, 2006, pp. 188–189; Musso, 2003 cited in Stalder, 2006, p. 178). In effect, this is what could be considered as a network's process of natural selection for the network to be adaptive. Nodes that contribute more, enable more links and as a result have a stronger identity in relation to the network. In networked art, there is, as mentioned above, one such example of inequality between the roles of artist and observer–user as a consequence of levels of insight into the artwork. This inequality is created as a direct result of the artist and observer–user's existing identity before they become nodes of a networked artwork. The artist for example already has the role of artist,

specifically artist as author, before the networked artwork is fully conceived while the observer–user has no such role in relation to that artwork. Therefore, as a result of this inequality, certain nodes have more links than others in networks and can potentially be more dominant because they contribute more valuable information to the network and "increase their importance for the network" (Castells, 2001 cited in Stalder, 2006, p. 188). In networked art, this means that more dominant nodes such as the artist can carry out cognitive or action events more intuitively, in more quantity and at a faster speed.

In addition to the possibility of a node within a networked artwork being a network external to the networked artwork, a node within a networked artwork can also be a network within the networked artwork. For example, the computer-based artwork discussed above that has an electrical network as one of its nodes or is one of the electrical network's nodes may have nodes that are networks of parts. This artwork could, for example, include hardware parts, which would as a *part of the artwork* be the first type of non-cognitive node. It may have nodes that are networks of *versions or copies of production*, such as software, the second type of non-cognitive node. It may even also have nodes that are networks of *observer–users or artists*, all types of cognitive nodes. In effect, this means that all nodes in a networked artwork can potentially be networks and/or be part of other networks allowing overlaps between networks, similar to the relationship between a system and suprasystem defined by Backlund (see chapter 2.3). As such, these types of nodes are termed a *network as node* in networked art.

The relationship between an artwork and culture is an example of a network as node. Typically, an artwork is a node alongside other artworks, galleries and so forth as nodes, which cumulatively yield culture as a network. In effect, this means that an artwork can simultaneously be a network and a node of another network. There are several scenarios which uphold this in networked art. For example, an observer–user can cognitively link artworks that they have seen as a result of media, style, theme and so forth conceiving of what could be considered as a network based on type or genre. An artist can also actively link artworks or allow observer–users to link artworks thereby conceiving through various methods of sampling, remixing, appropriation or plagiarism. In both these instances of cognitive nodes carrying out

cognitive or action events, it is evident that cognitive nodes can link nodes, conceiving or evolving the network, whereas non-cognitive nodes do not. Additionally, the ability of networked artworks to contain other networks demonstrates that networked artworks have a form of self-similarity or what Christopher Vitale terms as levels of networks (2014). All of this combined suggests that all networks, networked art included, have levels or hierarchy between nodes and between networks. While culture contains an artwork as a node, it can also be understood as informing or influencing the artwork. So culture can be considered as a node of that artwork. Therefore, while there must be inequalities between nodes, and nodes/networks can be within and without other networks in networked art as an existing network, hierarchy, defined as any ranking according to position, scale, level and so forth needs to be radically rethought if networks and nodes can be organised in any order.

My artwork titled *A network of people who attended an exhibition and contributed to the creation of this work* (Lynch, 2014 a) provides an example of many of the points raised in this section. It consists of a durational performance that occurs between observer–users. Observer–users are requested to email an address that is provided on a business card at an exhibition (Fig. 4.1.4) and on the website for the artwork. In the email, they state their name in the subject line and provide a statement about themselves and their interest in art within the body. A web application intercepts the email posting the observer–user's name and statement to the website. The observer–user and their post are visualised as a circle on the website; effectively what will become a node within an interactive diagrammatic network.

Once three observer–users have sent emails to the address, the web application starts to pair observer–users randomly and sends an email to introduce each pair. Each pairing is selected from the total set of observer–users, not excluding those who have already been paired, and as a result over time some observer–users become more connected than others. On the website, links between each pair of observer–users are indicated by the addition of a line between their nodes as a means of visualising that they have been paired and introduced. The introductory email encourages each observer–user to contact their paired partner by providing their name, statement and email address. In this way only paired observer–users

can contact each other. As more observer–users email the artwork, more nodes are added creating a diagrammatic visualisation of the network of people formed. The cognitive and action events between observer–users become a performance, their emailed information is its content and the diagrammatic visualisation, which can be interacted with to see who has been connected, comes into being (Fig. 4.1.5). The performance lasts for the duration of the exhibition at which point the website and diagrammatic visualisation are deactivated and archived as a type of 'virtual' sculpture documenting the performance.

Figure 4.1.4: *The business card employed as part of A network of people who attended an exhibition and contributed to the creation of this work (Lynch, 2014 a), exhibited at Colony 14 Festival, Cardigan, Wales. Photograph courtesy of Matthew Britton.*

A network of people employs a variety of node types. Observer–users are the *cognitive nodes* that are of foremost importance in the artwork. Without their engagement, there would be no performance, content, diagrammatic or social network. They are of course perhaps the most obvious example of a *network as node* in the artwork since they are themselves biological networks but also exist in other networks such as other social networks. The artist is also a *cognitive node* that is fundamental in conceiving of the artwork, designing the business card,

programming the website as well as organising the artwork to be exhibited. As such, the artwork demonstrates several example processes of the *artist as author*. The business card and website, *parts of the artwork* and as such both examples of *artwork elements* as *non-cognitive nodes*, facilitate the occurrence of the performance by providing informational entry points to the performance and, in the case of the website, simultaneously documenting it. However, the business card exists in multiple copies to allow observer–users to take them away and are therefore also an artwork element that is *versions or copies of production*. The website exists within the internet and as such is part of a network external to the artwork.

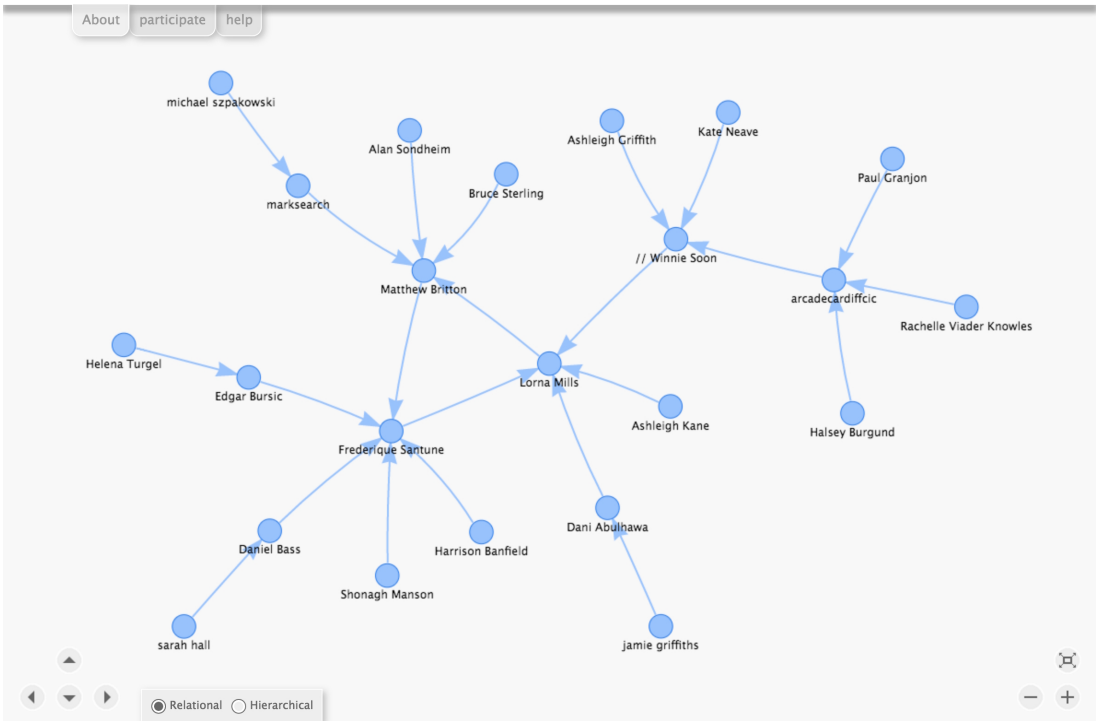

Figure 4.1.5: *The website for A network of people who attended an exhibition and contributed to the creation of this work (Lynch, 2014 a).*

The artwork is performed cooperatively by observer–users. They initially engage in a *cognitive event* with the artwork, interpreting the business card's function and mapping that understanding to what they see on the website. If they choose to, they then engage in an *action event* of sending an email to enter themselves into the artwork. Their and other observer–user's *action events* accumulate within the diagrammatic visualisation on the website, growing it in size, evolving its shape,

linking together more and more observer–users thereby starting the cycle of cognitive and action events again for both existing and new observer–users. Connections between observer–users are a result of their 'real' or 'virtual' visit to the exhibition and as such their assumed interest in art. The social network that is formed is therefore specific to the subject and context of art as a network. The diagrammatic network is a visualisation of the social network as a net or mesh of points connected by lines. By contrasting the social and diagrammatic networks, it is evident that as stated in the introduction to this section the diagrammatic network as a net or mesh is a visual metaphor for networks explaining nodes and links. However, the diagrammatic network equally functions as an interface to the artwork corresponding with Deleuze and Guattari's concept of a diagram as a map or plan (Watson, 2009, p. 12). Consequently, it provides an example of a network in networked art that is both typical of networks pre-systems studies, that is as having a visual basis, as well as networks post-systems studies that have a *functional basis* (see chapter 2).

A network is an “arrangement of interconnected nodes” (Rebelo, 2009).

4.2 Arrangement

With nodes in networked art defined in chapter 4.1 as one of three general types that are either cognitive, that is the *observer–user* and the *artist* or non-cognitive, the *artwork element*, it is now necessary to discuss how networks and thereby networked artworks are formed. This section discusses the formation of a networked artwork under the term arrangement, which is the second of the four key principles of the framework of networked art. Crucial to this discussion is the purpose of links as structuring a network (Latour, 2003 cited in Stalder, 2006, p. 178) and whether a network structure can be stable or unstable (Musso, 2003 cited in Stalder, 2006, p. 178) containing nodes that are equal or unequal (see chapter 4.1). Of additional importance is how the links may prolong or contribute even further to inequalities in the network. Rather than name links as one of the key principles of the framework they are instead considered a pervading quality of a network. They enable a network's nodes, that is its parts and the framework's first principle, to engage with each other thereby allowing the occurrence of all the framework's other principles. As such, links and the concept of connection they embody are considered essential to each of the framework's four key principles. By repeatedly returning to the discussion of links or implying them in each section in this chapter their purpose in a network and the interconnected structure of a network are mimicked through the structure of the discussion thereby emphasising links pervasive quality.

As discussed at the beginning of chapter 4.1, nodes and links in a network are codependent. Consequently, they should be considered of equal importance within the context of the framework. However, while links cannot exist prior to the existence of a network, without or outside a network, nodes can. Nodes can have an identity that is part of another network. Effectively they are still nodes but in another context.[91] Links contrastingly only come into being as a result of facilitating the

91 It should be noted, that the possibility of an identity that is not in some part nodal, that is not a part of any network, is considered impossible given the pervasiveness of networks as agreed by

relationship between nodes. Links are transient; created and destroyed as nodes become part of a network, change their relationships with each other or are removed from a network. Unlike nodes, links cannot move from network to network modifying their identities. Therefore links are defined through specific nodal relationships within a network. Since nodes and links in a network are co-dependant a discussion of the former will cover much of the latter.

Nodes that are unequal in a network are unequal because each node either brings a pre-existing identity to the network that is then modified by other nodes, its identity is formed anew by other nodes, or it is a combination of these factors (see chapter 4.1). Each node, therefore, may have unequal links, that is links that are more important than others or a greater quantity of links, prolonging or contributing to inequality within a network. All existing networks, such as networked art, contain nodes that are unequal. As such, while they are not necessarily hierarchical as a whole, existing networks contain hierarchies. Chapter 4.1 should be understood as forming an initial discussion from a nodal perspective of some issues relating to links, the remaining three sections of this chapter will discuss other important issues of links and how they relate to the framework's remaining three key principles.

The purpose of this section is to address how through the process of combination nodes come into being to form a networked artwork. Prompted by systems theory being a *general study of arrangement to form a system's structure* (see chapter 2.3), the term *arrangement*[92] is used to discuss nodal combination as part of the framework. If in a network, visualised as a mesh of points connected by lines, nodes are the points and links are the lines then the *act of arrangement* is the combination of those points and lines to create a state of arrangement. A networked artwork, however, is an entirely arranged network and so referring to it as a state of arrangement is unnecessary. Consequently, within the framework arrangement will refer solely to the *act of arranging*. Furthermore, it is only the initial act of combining nodes to form a networked artwork that is classified as an arrangement. As such, nodal arrangement is effectively conception of an artwork.

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numerous scholars including Castells (2000), Latour (2007) and Barabási (2002).

92 Throughout this research, please refer to the entry for arrangement in the glossary as a quick reference.

There are two types of arrangement possible. The first type of arrangement is the *act of creation*,[93] that is the creation of something new as a node within networked art. Creation occurs in the majority of art practice and is not particular to networked art. The second type of arrangement is the *act of identification*,[94] that is identifying something that already exists and designating it as a node within networked art. Identification in networked art is procedurally similar to the identification of nodes in systems studies (see chapter 2.3) in that the former culminates in a network as a networked artwork, while the latter culminates in a system. Both creation and identification employ an action event for the artwork to be manifested and communicated to an observer–user and as such both types of arrangement are considered to be occurring foremost through an action event. However, as briefly mentioned in chapter 4.1 arrangement, discussed only as conception in that section, incorporates a cognitive event that occurs before an action event, that is the artist thinks before they do.

Identification has much in common with curatorial processes in Relational Aesthetics (see chapter 3.4). Identification can be understood as a relatively new phenomenon in art practice within the contemporary era and has only been recognised as art in practices such as conceptual art, relational art (Bourriaud, 2002) and dialogical art (Kester, 2004). Arrangement as a term is employed in the framework as it acknowledges and incorporates both creation and identification in practice. Additionally, the term arrangement implies a *point of origin*[95] of nodes that consequently become a networked artwork. The point of origin is that which exists prior to a networked artwork being arranged and may or may not become a node of a networked artwork. While the possibility exists that the point of origin of a networked artwork could be either cognitive or non-cognitive, it is more likely that the point of origin is cognitive as it is assumed there is intent or motivation in the creation of art.

93 Throughout this research, please refer to the entry for act of creation in the glossary as a quick reference.

94 Throughout this research, please refer to the entry for act of identification in the glossary as a quick reference.

95 Throughout this research, please refer to the entry for point of origin in the glossary as a quick reference.

In networked art, as is the case in the majority of art, it is the artist who arranges an artwork through either an act of creation or identification and so they, therefore, are the artwork's point of origin. The artist as the artwork's point of origin indicates an initial hierarchy of nodes in an artwork, similar to hierarchies represented in Y-Post or tree patterns (see chapter 2.1). Just as an individual is positioned through such patterns and thereby attains a role within their lineage, tribe or universe, the artist is positioned within their artwork, their conceived universe, as an artist as author role (see chapter 4.1). The role of an observer–user occurs after an artist has arranged an artwork. The observer–user's ability to perform an action event means that the observer–user has authorial qualities. The observer–user's action event is not, however, considered arrangement as an artist's action or cognitive event always occurs before the observer–user's event. The artwork is already in existence and the observer–user is a node within the artwork as identified by the artist's arrangement. As a result, the observer–user is not creating or identifying nodes. They are instead rearranging nodes, themselves included, or at most are replicating those nodes with variations. Observer–users are in effect behaving within the networked artwork, and as such, they can never be an artwork's point of origin.

The difference between an artist arranging an observer–user, as a cognitive node, or a non-cognitive node as part of the arrangement of a networked artwork is that an observer–user can only be identified by the artist, but a non-cognitive node can be created or identified by the artist. By being a node, a non-cognitive node is, similar to a cognitive node, already part of an artwork arranged by the artist. It follows, therefore, that for the same reasons an observer–user cannot be a networked artwork's point of origin, a non-cognitive node cannot be the point of origin. However, examples of non-cognitive nodes proposed as an artwork's point of origin do exist within contemporary art. These include: Nicolas Schöffer's oeuvre (see chapter 3.1) and his aim to not create artworks but to create creation (1970); Jean Tinguely's kinetic machines, which could variously paint and perform (see chapter 3.2); and Harold Cohen's computer program AARON, which creates artistic images (see chapter 3.3).

From a networked art perspective, these can all be understood as unsuccessful propositions that non-cognitive nodes are the points of origin of an artwork that is

arranged, regardless of whether it is through performance, drawing or image creation. Each can only create within the parameters set by the artist, that is its point of origin. Until an artificial life form is created that can move beyond an artist's parameters to define its own, this will remain true. The examples demonstrate a non-cognitive node that is either rearranging nodes or replicating nodes with variations. In order to become an artwork's point of origin, a non-cognitive node must become cognitive to be able to arrange. While this would add a non-social sub-category to the category of cognitive, as discussed in chapter 4.1, it is speculative of a possible future occurrence. As such, discussion of the point of origin will hereafter mean only the artist as they are the only current possible point of origin of a networked artwork. Discussion will, however, be articulated in such a way as to allow the future incorporation of a cognitive non-social point of origin, should one come into existence, and in this eventuality expand the definition of what might be considered an artist within networked art.

As stated above the artist arranges through an action or cognitive event, specifically termed the act of creation and identification in arrangement. Arrangement, therefore, is an intentional acknowledgement of the inclusion of *interaction* from new media art (see chapter 3.3) and *relationality* from relational art (see chapter 3.4) in networked art. Consequently, the role of the artist to some extent merges with the role of the curator in networked art. This merger enables the artist to shift away from being associated with a craftsperson and allows the occurrence of art as a context. Art as a context is directly inspired by Ascott's conception of an artwork as *between behaviours* (see chapter 3.1), systems art's concept of an artwork as a system (see chapter 3.2) and new media art's concept of an artwork as a framework (see chapter 3.3). To enable art as a context,[96] the artist, through arrangement becomes a *context enabler*.[97] The act of arranging nodes, and the links that are formed as a result, produces a form, pattern, structure, configuration, composition, organisation and of course system as a network, which is particular to networked art and enables it to embody all that is required of an artwork. Arrangement can, therefore, be understood to be unique to the artist, distinguishing them from other nodes, within

96 Art as a context is associated with the third and fourth key principles of the framework of networked art and will be discussed in chapters 3.3 and 3.4.

97 Throughout this research, please refer to the entry for context enabler in the glossary as a quick reference.

networked art. Without their arrangement nodes do not come into being, links are not established, and as a result, a networked artwork is not formed.

Unlike many of arrangement's synonyms including structuring, ordering, classification, ranking and so forth that depend on one form of hierarchy or another, arrangement as a term can be hierarchically neutral. Arrangement and point of origin suggest a position within a space, whether that is an abstraction of space as discussed in Chess or the subjective and objective representations of space in maps (see chapter 2.1). The suggestion of position and space may seem an adverse effect on the concept of a network in this framework, particularly in light of theorists such as Deleuze and Guattari's development of the rhizome as a network (see chapter 2.2). For Deleuze and Guattari networks contain “no points or positions” (2004, p. 8–9) and are not “amenable to any structural or generative model” (*ibid*, p. 13) thereby removing it from considerations of position and space. So why then employ terms such as arrangement and point of origin, suggesting position and space, in the framework if networked art is a networked form and its space can be solely a cognitive space? Once again the crucial difference between networked art and Deleuze and Guattari's concept of a network is that the former is an existing network while the latter is a possible and idealistic network (see chapter 4.1). As an existing network, networked art must be more than possible. Equally, if the framework is to be employed, it must be capable of being applied in networked art.

Why not employ the term pattern, that is the act of creating a pattern discussed at great length with regard to the pre-history of networks in chapter 2.1 and has no such suggestion of position and space, in preference to arrangement in the framework? As detailed in that discussion the overall trajectory of networks prior to the emergence of systems studies and the developments in technology and art that they influenced, of which this framework of networked art is a part of, moves from networks having a predominantly visual basis to networks post these developments having a predominantly functional basis. A case in point of how networks demonstrate a functional basis are technological developments in wireless networks ranging from communication protocols such as WiFi and Bluetooth to electrical energy transmission (Hadley, 2007). To refer to networks as a pattern following their evolution from visual to functional would return them to their pre-systems studies

state of having a visual basis. Within a networked art context, it would also put networks in dialogue with the theoretical discourse of the image as representation. This connection would broadly contradict Deleuze and Guattari's proposal of a diagram's purpose (Watson, 2009, p. 12) outlined in the introduction to this chapter and therefore the framework as a network as diagram. While the framework as a network as diagram is visual, it is not exclusively representative of a network in the way that patterns are. The framework is a network, it is an abstracted example of a networked artwork that serves as a map or plan to arrange networked art and, therefore, it is foremost functional. Regardless of whether creation or identification is referred to, arrangement is a more suitable term than pattern within the framework because it is a creative act and therefore supports networks post-systems studies purpose of functionality. Nodes are arranged to structure and enable a networked artwork. A pattern, however, is only the result of an arrangement, an image or representation of its outcome.

Arrangement is, however, more than just spatial positioning of nodes within a networked artwork. It is how a node is related to other nodes and the links that are formed as a result. For an observer–user and artist, for example, arrangement both places them and establishes their roles in a networked artwork. As such, arrangement demonstrates that networked art has both a functional and symbolic purpose, similar to the purpose of networks as visual patterns and functional forms (see chapter 2.1). Arrangement in networked art, therefore, includes all definitions of the term and their potential outcomes that may be spatial or otherwise. This incorporates terms such as composition, juxtaposition, formation, balance, imbalance, symmetry, asymmetry, comparison, contrast, harmony, discord and so forth. While arrangement through an action event occurs within a materially existing or 'real' space and as a result is considered *spatial*, a cognitive event occurs in a cognitive space and is considered *mental*.

The visualisation of the framework of networked art takes as its starting point the Conceptual Framework of Art. The Conceptual Framework of Art defines the agencies of artist, artwork, audience and world as an arrangement of four parts or nodes that can be illustrated in a diagram as shown in Figure 4.2.1. When compared to Figure 4.1.3, audience can for the moment be considered similar to observer–user

and artwork as similar to the artwork element, which encompasses all types of non-cognitive nodes. In a sense, the framework of networked art can be understood as a specific framework for networked practice complementing the Conceptual Framework of Art, a general framework for all art practice. As such, the form of the Conceptual Framework of Art, that is as a triangular arrangement of parts or nodes encapsulated by a circle, is adopted to visualise the framework of networked art.

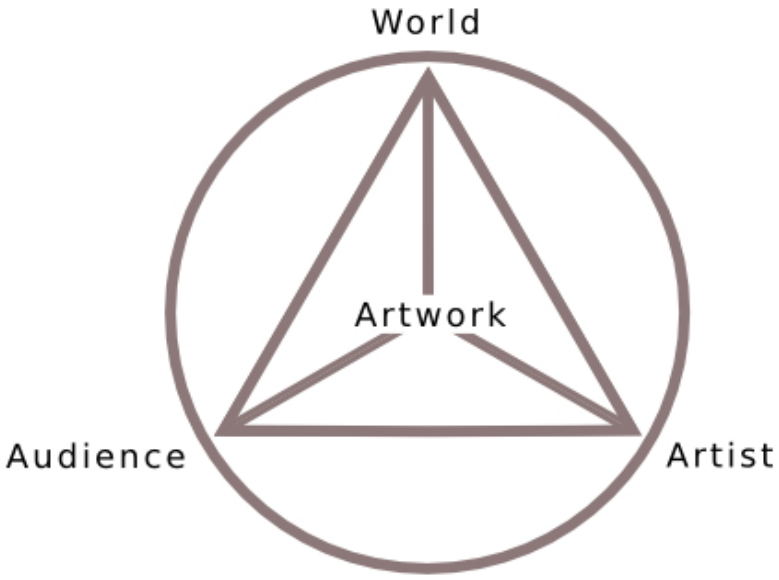

Figure 4.2.1: *The Conceptual Framework of Art. Adapted from a diagram from Stage 6 Visual Arts: Key Concepts and Terms, the New South Wales Department of Education and Training (n.d, p. 22).*

There are several ways of viewing and interpreting the diagram of the Conceptual Framework of Art. Firstly, it can be viewed as a collection of two-dimensional shapes, specifically as three congruent obtuse isosceles triangles joined to create an equilateral triangle within a circle (Fig. 4.2.2). In this view, the artist, audience and world form the points of the equilateral triangle while the artwork forms the middle point that divides it into the three congruent isosceles triangles. The artwork can, therefore, be interpreted as the point of intersection of the artist, audience and world and as being contained within as well as overlapping their contexts. The artist conceives of the artwork, the audience observes the artwork and the world is subject matter or content for the artwork; each influencing and then in turn being influenced by the artwork in one respect or another. Positioned as an internal point of the

equilateral triangle the artwork suggests that it is manifested by the other three parts or nodes. This positioning creates a hierarchy of artist, audience and world as existing first to artwork being conceived or arranged last. However, it also suggests that the artwork is an artefact or event occupying a point in space and/or time. As such, the artwork is dependent on artist, audience and world, however, not required for their existence. Finally, the world can be interpreted as the top or first node of the diagram if the diagram is considered vertical or is read following western reading conventions of left-to-right and top-to-bottom. This reading suggests a hierarchy, with artist, audience and artwork all emanating from the world. The internal lines of the equilateral triangle, which resemble the branching root structure of a tree (see chapter 2.1) re-enforce this suggestion of hierarchy.

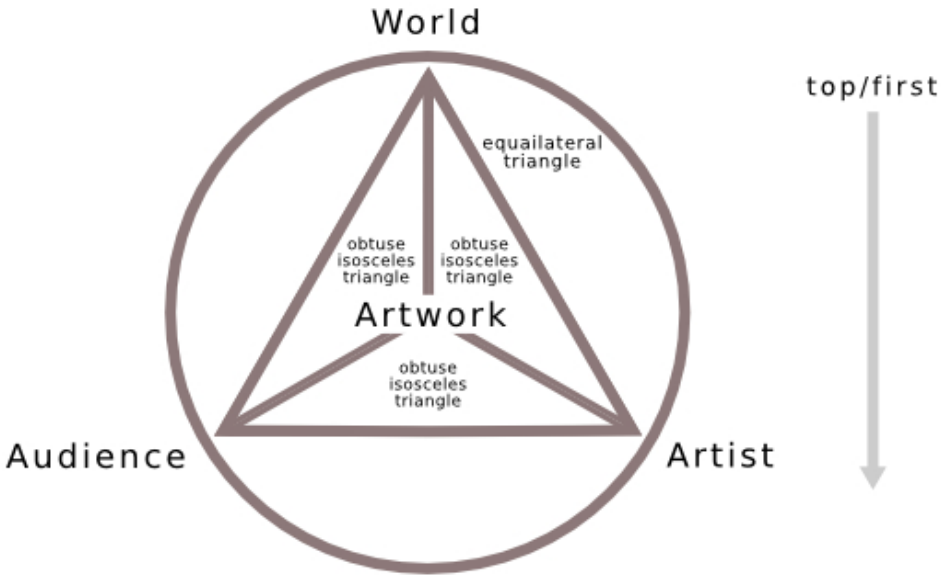

Figure 4.2.2: *A modified version of the Conceptual Framework of Art viewed as a collection of two-dimensional shapes with a top-down hierarchy.*

As well as being interpreted two-dimensionally the diagram of the Conceptual Framework of Art can be interpreted as a three-dimensional shape, that is as a tetrahedron viewed from thirty degrees above the x-z plane and with artwork as the furthest node from the viewer along the z-axis. Figure 4.2.3 illustrates the framework as a tetrahedron viewed from this perspective. Artist, artwork and audience form the points of the base of the tetrahedron, and the world forms the apex. Comparable to the hierarchy of the two-dimensional interpretation, the world is considered as

existing first and therefore is positioned on a top horizontal plane in the arrangement while the base, artist, artwork and audience all exist on a bottom horizontal plane. Artist and audience form two points of the tetrahedron's base on the same front vertical plane. The artwork forms the third point of the tetrahedron's base on a back vertical plane. Assuming that all sides of the tetrahedron are equal in size the world is positioned between the front and back vertical planes. As a result of the added dimension of depth, a hierarchy running from foreground to background along the viewer's line of sight, the artwork can be suggested as the last node. In the three-dimensional interpretation of the Conceptual Framework of Art, the artwork can therefore once again be considered as a node manifested by the other three nodes. It is the final point in time and/or space of the framework following the metaphor of time equating to a horizontal spatial position, that is the location of the viewer is the present, the past is behind them and the future in front of them.[98] The form of the tetrahedron additionally suggests, however, more coherently than as a triangle, that all nodes within the Conceptual Framework of Art are points in time and/or space.

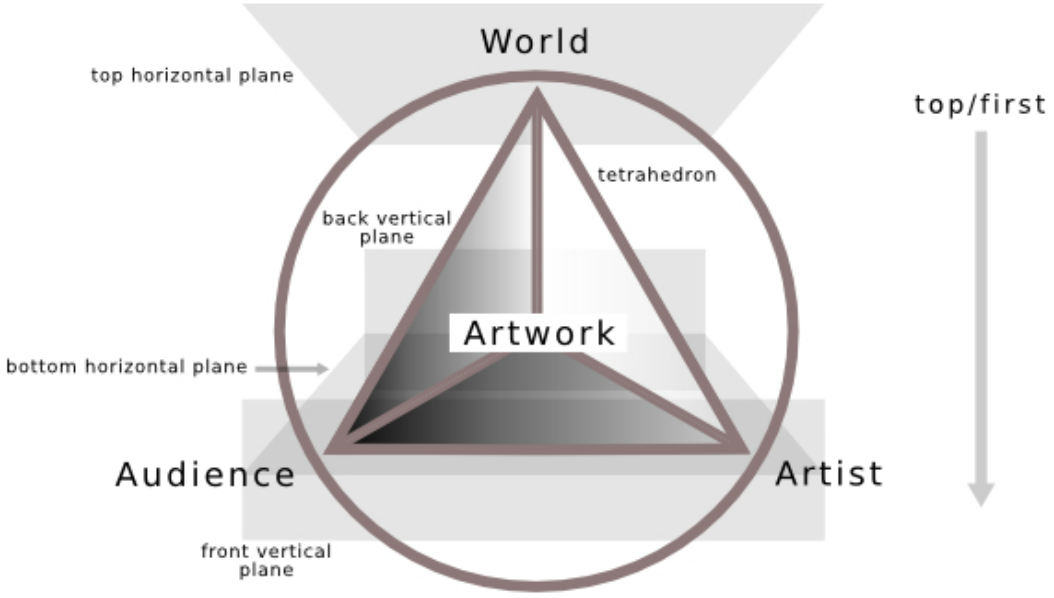

Figure 4.2.3: *A modified version of the Conceptual Framework of Art viewed as a three-dimensional tetrahedron. The tetrahedron is illustrated with an approximately thirty-degree elevated front view.*

98 This metaphor is employed by several of the spatial nets or grids discussed in chapter 2.1 including games and maps.

If the Conceptual Framework of Art is illustrated as a tetrahedron viewed from thirty degrees below the x-z plane with artwork as the closest node to the viewer along the z-axis most aspects of hierarchy discussed above remain true. There is, however, one significant change. Since the artwork would be positioned in front of world, artist and audience, it would, following the metaphor of time equating to a horizontal spatial position, suggest that either the artwork is the first of those four nodes or that the metaphor should be inverted with the positions of past and future exchanged. Neither of these is considered reasonable because in the case of the former the artwork could exist before the artist and in the case of the latter, a commonly understood spatio-temporal metaphor would be disregarded. As such, the thirty-degree lowered front view is not considered further.

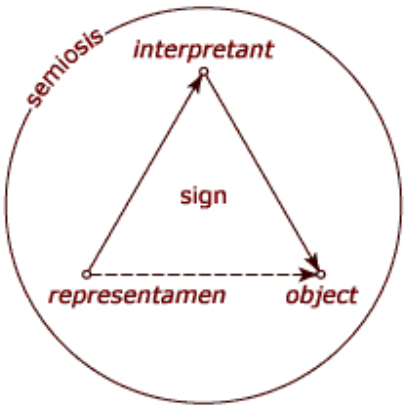

Figure 4.2.4: *Charles Sanders Peirce's model of triadic signs (Irvine, 2012).*

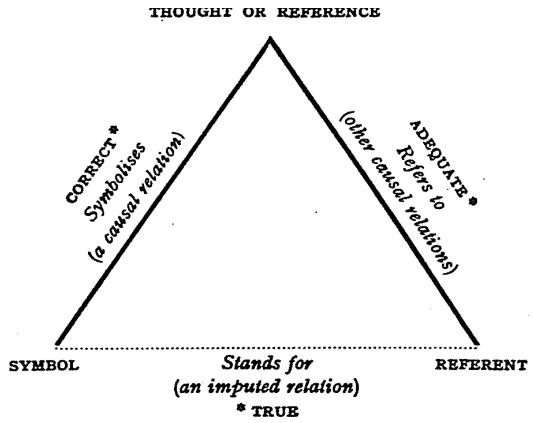

Figure 4.2.5: *Charles Kay Ogden and Ivor Armstrong Richards' semiotic triangle (1989, p. 11).*

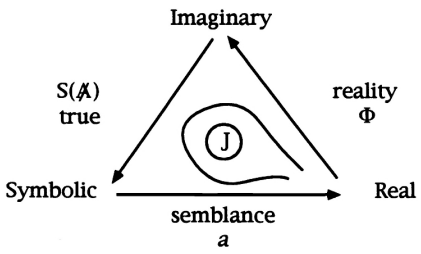

Figure 4.2.6: *Jacques Lacan's three registers of the Imaginary, the Symbolic, and the Real (2000, p. 90).*

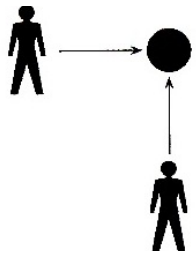

Figure 4.2.7: *Dominic McIver-Lopes' model of appreciation with artist top left, artwork top right and spectator bottom (2010, p. 69).*

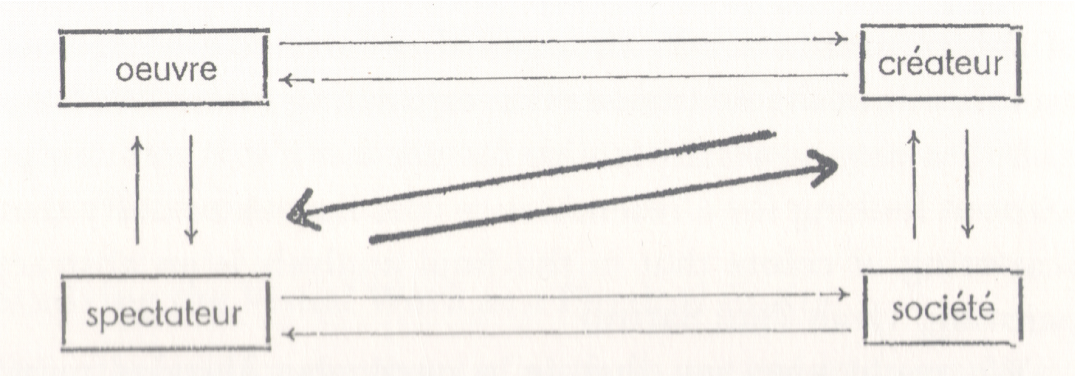

Figure 4.2.8: *François Molnár and François Morellet's cycle of actions with artwork, creator, society and spectator (1963, p. 142).*

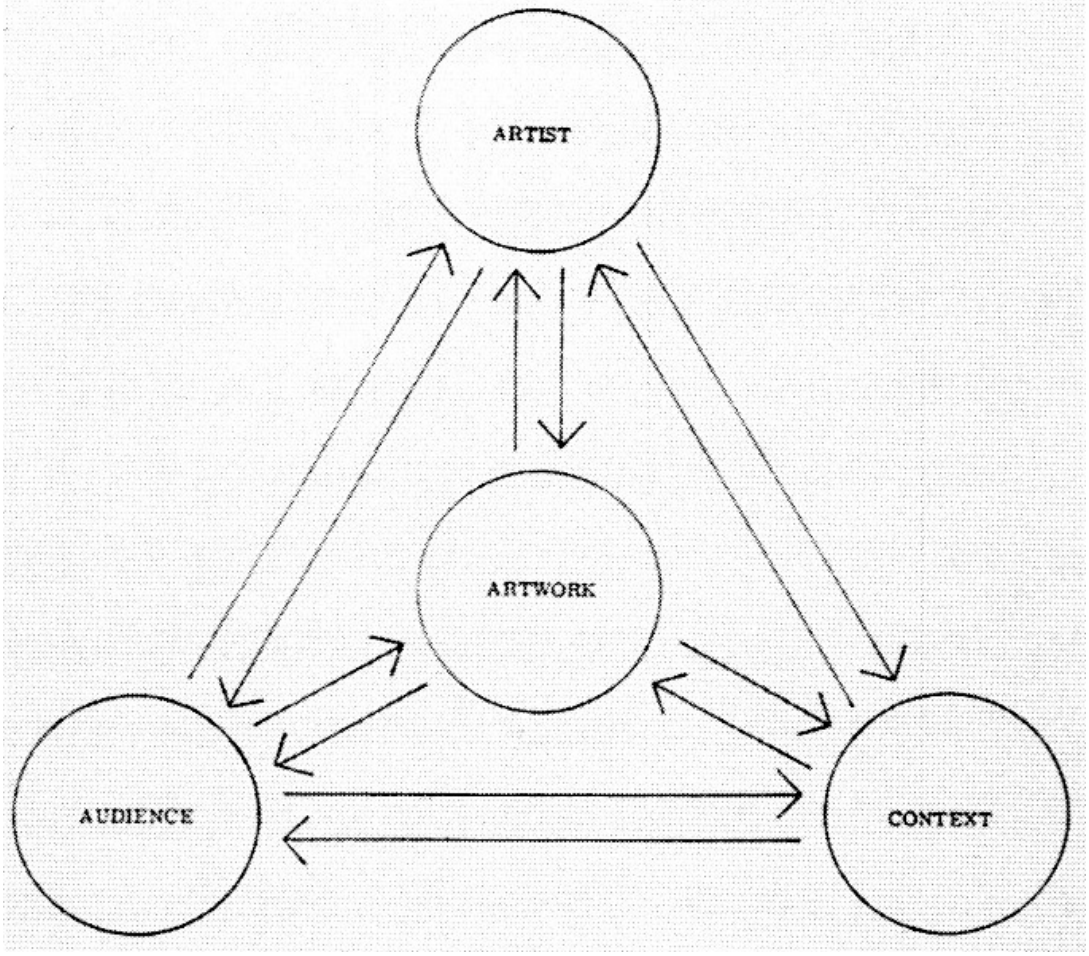

Figure 4.2.9: *Stephen Willats' A Socially Interactive Model of Art Practice (Kester, 2004, p. 92).*

While there are similarities between the Conceptual Framework of Art and the framework of networked art, there are also key differences in how the latter's parts are arranged and named. The framework of networked art draws inspiration for this from several additional sources. These include: Georg Simmel's social network diagrams (Mayer, 2009); Charles Sanders Peirce's theory of triadic signs of representamen (sign), object (semiotic sign) and interpretant (interpretant sign) (Irvine, 2012) (Fig. 4.2.4); Charles Kay Ogden and Ivor Armstrong Richards semiotic triangle (1989, p. 11) (Fig. 4.2.5), a variant of Peirce's theory; Jacques Lacan's theory of the three registers of the Imaginary, the Symbolic, and the Real (2000, p. 90) (Fig. 4.2.6), which is discussed alongside Deleuze and Guattari's theory of virtual/actual and real/possible in chapter 1.3 (Fig. 1.3.1); and Dominic McIver-Lopes models of appreciation (2010, p. 69) (Fig. 4.2.7) and its conception of artist/user relation to an artwork. These have in turn inspired artists' theoretical frameworks including Roy Ascott's forms of behaviour (see chapter 3.1), François Molnár and François Morellet's cycle of actions (1963, p. 142) (Fig. 4.2.8) and Stephen Willats' A Socially Interactive Model of Art Practice (Kester, 2004, p. 92) (Fig. 4.2.9), which is highly reminiscent of the Conceptual Framework of Art.

The framework of networked art's three general nodes, artist, observer–user and artwork element, explained and discussed in chapter 4.1 (Fig. 4.1.3), can be arranged in the form of an equilateral triangle (Fig. 4.2.10 and Stage 1.00 of the model), which is similar to the Conceptual Framework of Art. The artist forms the left point of the triangle, the observer–user forms the right point of the triangle, and the artwork element forms the remaining point of the triangle. Their combination as the triangle is the artwork and is enclosed by a circle which represents culture. Culture refers specifically to human culture (see chapters 2.1 and 4.1) and in some respects can be considered the counterpart to world in the Conceptual Framework of Art. Similar to world, culture is the first part of the framework of networked art. Unlike world, however, which forms the top or first node of the Conceptual Framework of Art's triangle, culture as a circle encompasses the framework of networked art's triangle and thereby all parts of it. As such, it is interpreted as first moving from without or outside the framework inwards. Culture consequently cannot be considered as a node and equal to artist, observer–user and artwork element as it is

not within but without a networked artwork. Additionally, culture is not solely a site or subject for the artwork, such as our planet as a location of occurrence or what is contained within the planet as a source of inspiration, as suggested by the use of world in the Conceptual Framework of Art.

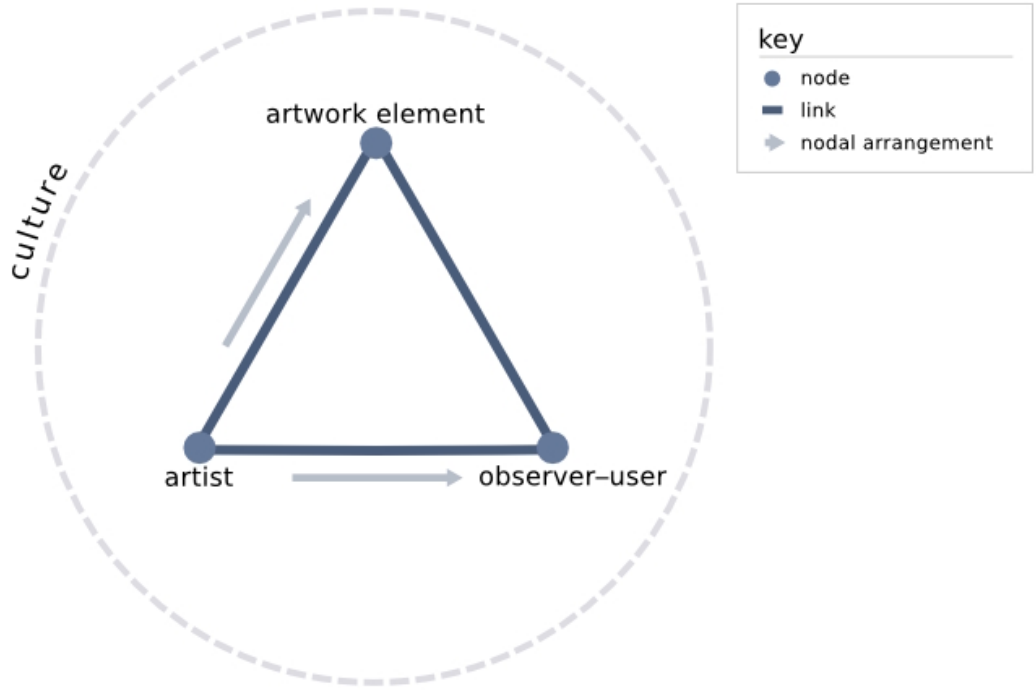

Figure 4.2.10: *The framework of networked art. A left to right hierarchy of arrangement is illustrated by the use of arrows from the artist; the point of origin.*

Culture is instead understood as the total context the artist, observer–user and artwork element exist within at all stages of arrangement, observation and use. By employing the term culture instead of world employed in the Conceptual Framework of Art any association of our world as geographically demarcating the limit of human culture is eliminated. As such, this removes any emphasis on networked art practice as one that is required to be site-specific or that may be subject-defined because of its location of occurrence. By employing culture as expressly referring to human culture within the framework of networked art, it is a reminder that networked art practice is, as all art practice has been argued in this research, a uniquely human practice. As a consequence, this necessitates that there must be a cognitive node,

that is a human, within a networked artwork at some point of its existence such as an artist at the time of the artwork's arrangement or an observer–user at the time of its observation and/or use. The possibility of an artwork that has only non-social nodes is precluded, including for example an artwork arranged, observed and used by cognitive but non-social animals or by non-cognitive artwork elements. More importantly, however, the reference to human culture as part of the framework of networked art means that anything and everything that can ever be arranged by an artist can potentially be employed as nodes in networked art. Not alone does this in a sense future-proof the framework from technological obsolescence but it allows the possibility to incorporate all types of yet to be discovered or understood knowledge. It ensures that the framework can be applicable beyond present means, sites and contexts as well as incorporating all types of existing, whether 'real' or 'virtual', nodes as a part of itself. Distinctions between what is 'virtual' and 'real', such as those delineated in Lacan's Imaginary, Symbolic and Real (Johnston, 2013) as well as Deleuze's virtual/actual and real/possible (Deleuze, 1991; 2002), become unimportant. What's important is that all nodes exist as a part of human culture. The form they exist in, or lack of, is a state of being for nodes.

The artist in the framework of networked art is positioned as the left point of the triangle while the observer–user is positioned as the right point. This positioning is the inverse of where artist and audience are positioned in the Conceptual Framework of Art. The artist arranges, that is they create or identify, other nodes which then become linked as the artwork. They are therefore considered as initiating the artwork and are its first node. A left-to-right hierarchy that follows western reading conventions of left-to-right, as well as a convention for flowcharts and diagrams that are in left-to-right languages is employed to indicate this. The artist is only preceded by the context of culture within which they and all other nodes in the framework reside. The artist is a context enabler for other nodes, and as such, they identify both artwork element and observer–user, the remaining two points of the triangle, by arranging them as nodes within the artwork.

Observer–user is employed in the framework of networked art to consolidate the roles of observer and user into one (see chapter 4.1). Observer–user should not be interpreted as a substitute term for either role or as an indication that the roles are

comparable but instead that they are fundamentally connected. Observer–user signifies and through the use of a dash typographically visualises this connection (Fig. 4.2.11 and Stage 5.00 of the model). Just as a cognitive event always occurs before an action event as part of the artist's arrangement, an observer's cognitive event always occurs before a user's action event. As such, observer precedes user in the term observer–user. Observer and user can be considered as points on an observer–user continuum of event occurrence that runs from left to right. However, the continuum is equally an indication of each term as applicable to art history. Considered as a timeline or chronology it represents a shift in the role of audiences[99] over time as part of what I have termed the grand-project of questioning conventional concepts of the art form in the modern era; that is the role of the artist, art as object, the means of its creation and the role of the observer (see chapter 3.1). Therefore, cognitive and action events, as well as the observer and user who cause them, are not opposed based on ideas of passiveness or action as has frequently been suggested within contexts such as new media art (see chapter 4.1). Observer–user is also employed in the framework of networked art in preference to the term Audience in the Conceptual Framework of Art. Its use is in recognition of the roles of observer and user as distinct in their processes from those of an audience. Observer–user should not be collectively referred to as the audience due to the historical complexities of audience, its emphasis on plurality and arguably implied passiveness concerning the artwork.

The artwork element forms the third point of the triangle, the top or apex of the triangle, in the framework of networked art. It is not analogous to, or a repositioning of Artwork in the Conceptual Framework of Art but rather a part of an artwork. The artwork is the combination of all node types. All nodes in a networked artwork can potentially be a network as node, that is a network that is itself a node within a networked artwork (see chapter 4.1). For example, observer–user is reducible to its two roles, the individuals performing those roles and finally each individual's parts such as their organs, cells, atoms, character traits, skills and so forth. Equally, artist and observer–user can be plural. There can be two or more artists collaboratively arranging an artwork or two or more observer–users engaging in a cognitive or action

99 An en dash is specifically employed in the term observer–user as a representation of the temporal ordering discussed, that is from the cognitive event to the action event and from observer to user.

event within an artwork. Consequently, artists and observer–users can each be a network within the networked artwork and therefore considered as a network as node. It is unlikely, though not impossible, that an artwork element within a networked artwork will be singular. The two types of artwork element, that is a part of the artwork or a version or copy of the artwork (see chapter 4.1), both suggest plurality. There will typically be more than one part of an artwork and frequently more than one version of an artwork so each of these types of artwork element can be a network as a node.

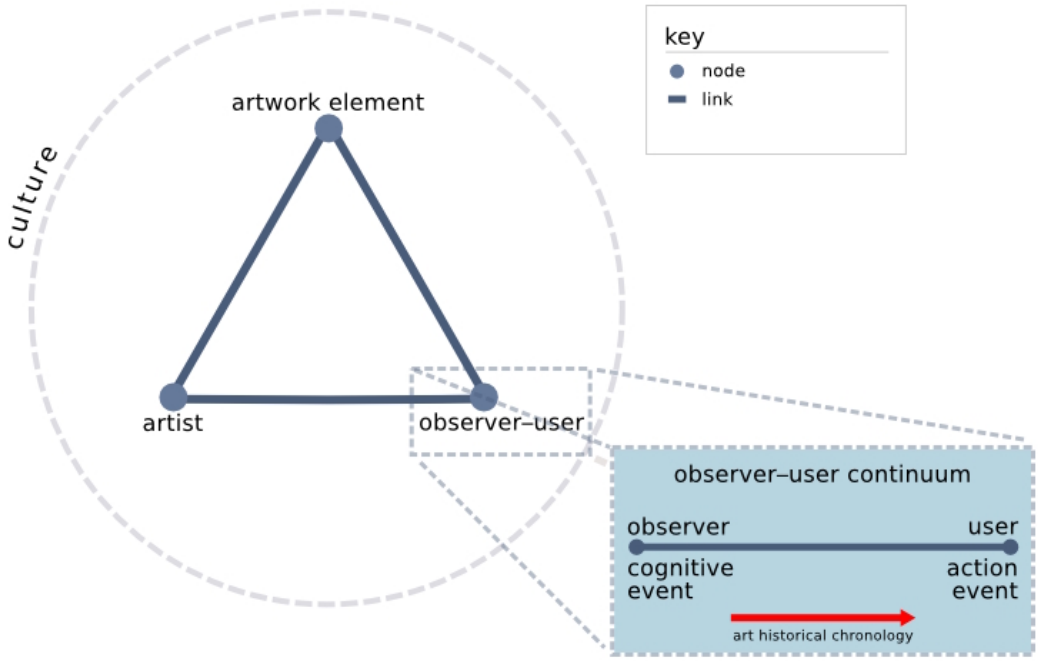

Figure 4.2.11: *The framework of networked art shown with a detailed view of the observer–user continuum.*

Artwork element, artist and observer–user in their singular form are the minimum three nodes that constitute the framework of networked art and as such form a networked artwork. However, assuming that once an artwork is arranged an artist does not continue to act on it, thereby removing themselves from it, a networked artwork with only two nodes, an observer–user and an artwork element, is possible. This type of artwork, however, would not yield a robust network and it is suggested that only two nodes would quickly lead to entropy in the networked artwork.

Combinations of artwork elements are typically employed to enhance or complexify the artist's ability to arrange and facilitate the artwork's existence.

Transformations: Actions to Matter / Matter to Actions (Lynch, 2015–ongoing), another of my artworks created as part of this research, is a performance that provides an example of both the act of creation and identification as part of arrangement in networked art. The title of the artwork refers to the artist's actions as arrangement throughout the performance as being transformed to matter and that matter subsequently being transformed into actions. The procedural basis for the artwork is based on Robin Sloan's neologism the flip-flop (2012). The flip-flop describes a creative “process of pushing a work of art or craft from the physical world to the digital world” (Sloan, 2012), that is from the 'virtual' to the 'real' until a result is achieved.

The artwork consists of a series of performative actions employing what is colloquially termed as the 'free stuff' online community. The community consists of free product and service offers, samples, trials, competitions and the internet users that attempt to obtain or win items. Each action in the performance occurs in two stages. In the first stage, titled Actions to Matter, I acquire items for free online. Items must be objects of any description, in effect what is termed as matter, and not consumable products, services or vouchers. In stage two, Matter to Actions, the acquired items are sold or given away for free online. Actions are documented through two separate weblogs, one for each stage of each action, which are embedded into a website that contains information about the performance. The weblog for Actions to Matter (Fig. 4.2.12) documents the process of acquiring each item as a post containing screenshots and a short description of the items source. The post is dated with the day and time of the action and initially tagged with the keyword unsuccessful. If the item is subsequently received, the post's tag is changed to successful. The weblog for Matter to Actions (Fig. 4.2.13) documents each received item as a post containing a short description and a commercially styled product photograph taken within a light box. The post is initially tagged with the keyword unsold. When the item is offered for sale online, a plugin tracking the sale is added to the item's post. If the item sells, the post's tag is changed to sold, if it is given away for free it is changed to gifted. Finally, the item is sent to the new

owner with an information card containing a link to the item's post online as a form of provenance.

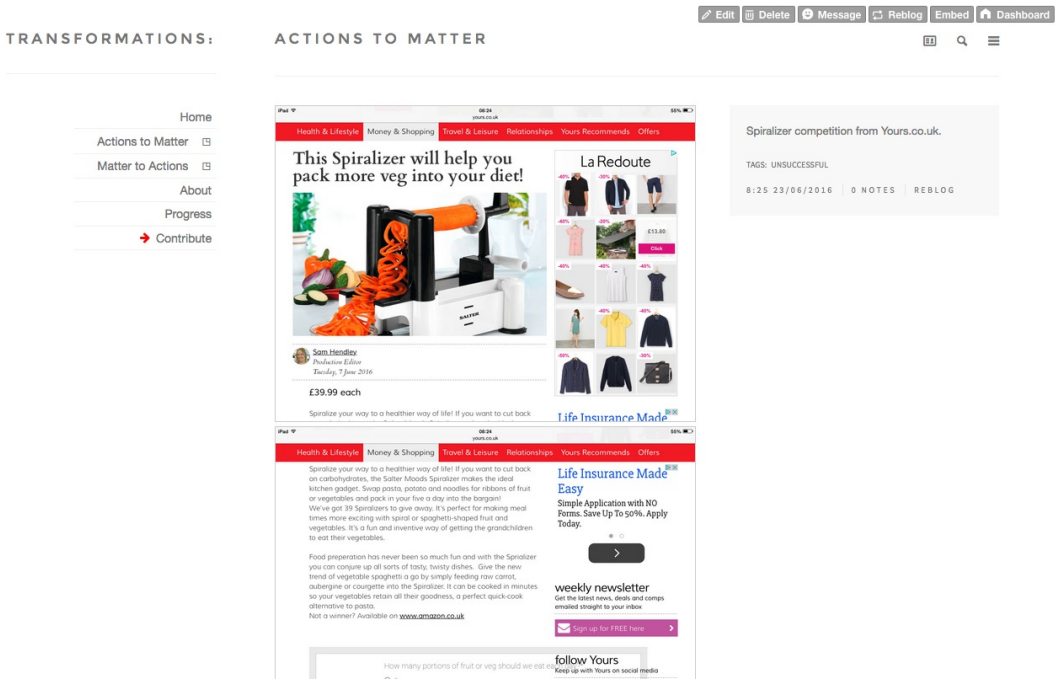

Figure 4.2.12: *Transformations: Actions to Matter / Matter to Actions (Lynch, 2015–ongoing). The Actions to Matter weblog is shown with details of an action performed online.*

By acquiring items online that are subsequently exhibited the artwork employs the use of appropriation in art. Items are acquired from culture at large, that is not necessarily from a context that relates to the artwork or art as a whole, as well as specifically from a 'virtual' space. The items are arranged, that is symbolically positioned, by myself as the artist through *acts of identification* to be art objects in a process similar to that of a readymade. However, the items also become nodes within *Transformations* the artwork as a network. As such, *Transformations* explores the juxtaposition of 'virtual' and 'real', in particular, the tensions and movement between them as a means to transform an act to an object. The artwork is thereby materializing (Lippard, 1997) art as object and questioning the ideals of objecthood (Fried, 1998). Equally, however, everyday items are positioned or *identified* as art thereby transforming their purpose.

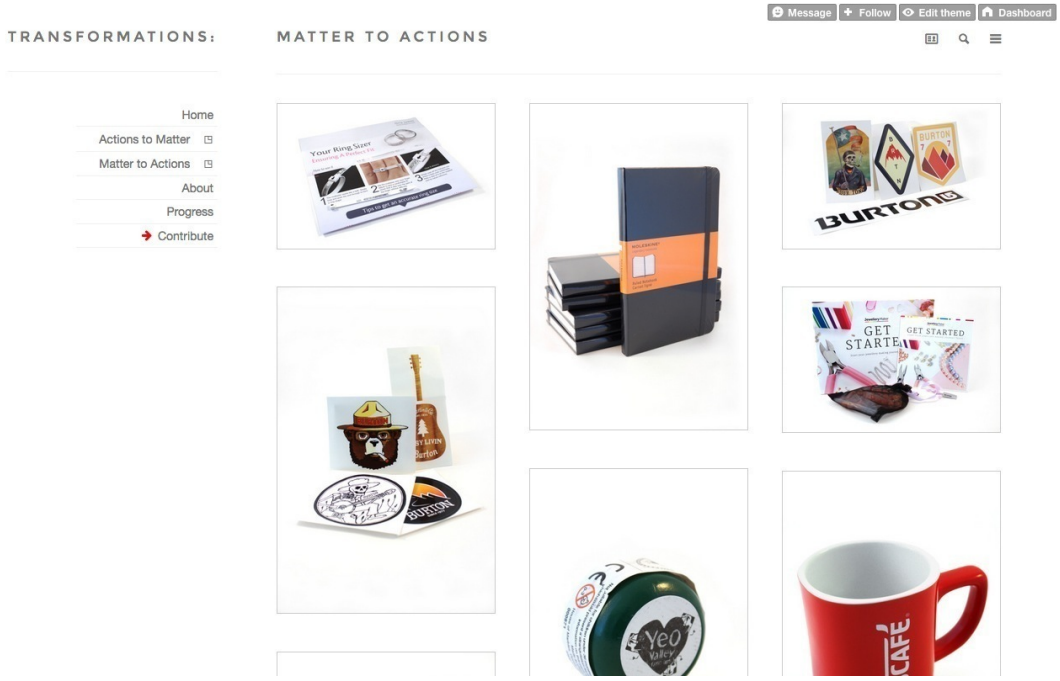

Figure 4.2.13: *Transformations: Actions to Matter / Matter to Actions (Lynch, 2015–ongoing). The Matter to Actions weblog is shown with previews of successfully acquired items.*

In subsequent actions by myself as the artist when the art objects are redistributed online, it is their dematerialization (Lippard, 1997) that is explored. Their identification as art is maintained during the process of selling or gifting as well as through the information card provided to the owner. In parallel to the identification of items as art, the artist arranges other nodes through *acts of creation*. These are principally platforms to present the artwork. They include the weblogs and website created to facilitate the exhibition of the art objects online and advertise them for redistribution as well as the manner in which the artwork is presented in a gallery to facilitate the exhibition of the art objects through an event in 'real' space. It is the combination of outcomes of all *acts of identification and creation*, including: the acquired items, weblogs, website and information cards as artwork elements; item owners, visitors online and to the gallery as observer–users; and myself as artist; that is the performance as networked artwork.

At the time of writing stage one Actions to Matter, which commenced in February 2015, is complete with ninety items acquired. Stage two Matter to Actions commenced with all acquired items being exhibited as part of the exhibition of this

research's practice as research.[100] On completion of the artwork, all items will have been sold and/or gifted online leaving only the documentation weblogs, website and money from sales. While the weblogs are 'virtual' documentation, that is digital and immaterial, the money is also considered a form of 'virtual' that represents value. This interpretation in itself allows a conclusion to the artwork that remains within the 'virtual', that everything has been transformed back to an action with no remaining matter, and as such adheres to the artwork's procedural rules.

100 The exhibition *Transformations* occurred at Borough Road Gallery from the 23rd to 30th of June 2017 (Appendix A).

> “The behavior of each element has an effect on the behavior on the whole” (Ackoff, 1981 cited in Backlund, 2000, p. 447).

4.3 Behaviour

If arrangement is the conception of a networked artwork, that is the creation or identification of nodes through an action or cognitive event that are then combined, then rearrangement is all subsequent arrangements of an existing networked artwork's nodes. As such, when rearrangement occurs, the artwork already exists. This section discusses the rearrangement of networked artwork's nodes under the term behaviour, which is the third of the four key principles of the framework of networked art. Nodal rearrangement is significantly different to arrangement. Arrangement consists of a defined end, that is the networked artwork, and is therefore of limited duration. Rearrangement, however, is ongoing and continues throughout the existence of the networked artwork. Rearrangement, therefore, does not have a final defined state.

As discussed in chapter 4.2 it is the artist, currently the only possible point of origin that is cognitive, who engages in the arrangement of nodes. They do this prior to, and therefore from without or outside, the networked artwork being arranged. Any node, however, that is artist, artwork element or observer–user can engage in rearrangement from within a networked artwork that is already arranged. Rearrangement is achieved by a node performing an action or cognitive event on one or more other nodes. Arrangement is in all current instances engaged in by the artist to enable other nodes to rearrange each other and as such become collectively identified as a networked artwork. The artist is referred to as a *context enabler* because of this. Arrangement may or may not facilitate the artist's ability to engage in rearrangement within the networked artwork once the networked artwork exists. Rearrangement, however, is first and foremost always intended to facilitate the node that initiates the rearrangement. It enables their relationship with one or more other nodes to change.

Given the significant difference between nodal arrangement and nodal rearrangement outlined above, it is essential to distinguish them. As such, nodal rearrangement is termed *behaviour*[101] as part of the framework of networked art. Arrangement and behaviour are carried out through cognitive or action events, which are effectively communicative processes. One-way communication generally occurs during a cognitive event; specifically, the cognitive node that initiates the cognitive event is communicated to by one or more other nodes, however, it does not reply. Two-way communication only occurs during action events; that is two or more cognitive or non-cognitive nodes acting on each other in succession. Action events are equivalent to the input-output or feedback model in systems studies, what Kirsh terms as the decision cycle model (1997), and are part of the process of interaction in new media where one action will generally lead to subsequent actions. It is possible, however, for one-way communication to occur during an action event. An action event from one node could have no effect on another node and thereby cause no response or feedback. In most instances, this would not be classifiable as an action event as change is required to demonstrate that action occurred. However, the possibility of action without effect or feedback is allowed to account for conceivably paradoxical scenarios, effectively a networked art equivalent of a rhetorical question.

Behaviour is a consequence of what is arranged. Arrangement and behaviour can, therefore, be understood as occurring sequentially as *stages in the chronological continuum* of a networked artwork. Arrangement, outlined in chapter 4.2, occurs first and is the conception of a networked artwork (Fig. 4.2.10 and Stage 1.00 of the model). It occurs through the artist's cognitive and action events, creates a hierarchy between the artist, who exists prior to the networked artwork's existence and already has an identity, and nodes that collectively become identified as a networked artwork. Once arrangement is complete, behaviour occurs and ensures the ongoing existence of the networked artwork through nodal cognitive or action events (Fig. 4.3.1 and Stage 4.00 of the model).

The node types and roles discussed in chapter 4.1 occur at different stages of the

101 Throughout this research, please refer to the entry for behaviour in the glossary as a quick reference.

two stages of arrangement and behaviour. The artist occurs during both stages of arrangement and behaviour, that is as author during the stage of arrangement and as observer or user during the stage of behaviour. All other node types and roles occur during the stage of behaviour. As can be seen, by contrasting Figures 4.2.10 and 4.3.1, Stages 1.00 and 4.00 of the model, arrangement in the former is indicated with one-way arrows originating from the artist as the point of origin whereas behaviour in the latter is indicated with two-way arrows. The arrows indicate a direction of intent from source to subject, similar to a sender-receiver model in communication theory, and provide a simple means of differentiating arrangement from behaviour. The direction of intent must not be confused or considered coinciding with the direction of cognitive and action events. Arrangement and behaviour can both employ one-way cognitive events and two-way action events. Cognitive and action events should not be principally delineated by a direction, even though it is a factor, but instead, the type of event that occurs, that is that the former is comparable to relationality in relational art and the latter is comparable to interaction in new media art.

Behaviour is the combination of nodes *cognitive* and/or *action* events within a networked artwork. It includes nodes that are joining or leaving the network. No node can, therefore, perform a cognitive and/or action event as part of behaviour in a networked artwork and be considered as occupying a position external to the artwork. Behaving by definition means inclusion in a networked artwork. Consequently, behaviour is considered an *emergent property of nodes* that are arranged. In Figure 4.3.1 behaviour is illustrated as part of the framework of networked art through the use of two-way arrows that are parallel to the links connecting the nodes of artist, artwork element and observer–user. While this illustrates that behaviour occurs between nodes, it is problematic. Behaviour running parallel to each link suggests that behaviour's cognitive and action events can only be a one-to-one communication between two nodes. As such, separate instances of cognitive or action events may be required for behaviour between groups of nodes, for example, if one node behaves with several nodes simultaneously. Separate instances of events are not required. Cognitive and action events can occur in a single instance as a one-to-one, one-to-many, many-to-one or many-to-many communication. The figure does not illustrate all these combinations as a consequence of a figure's limitations and the obfuscation it would create if it did so.

As a result, the figure suggests that behaviour is only an emergent property of two nodes when in fact it can be an emergent property of any number of nodes.

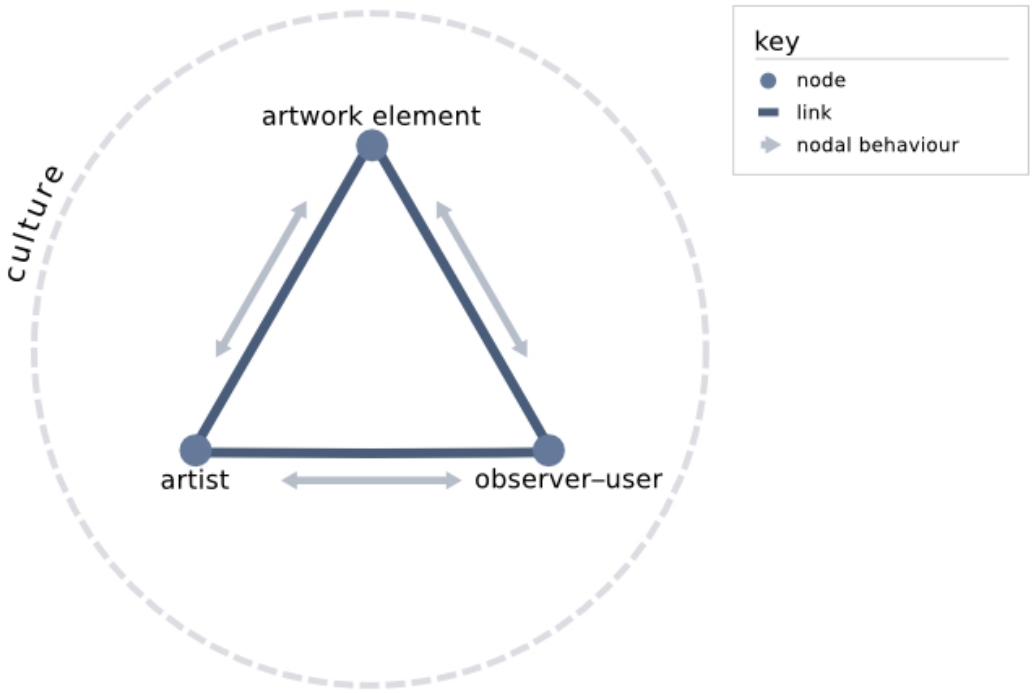

Figure 4.3.1: *The framework of networked art shown in the phase of behaviour. Arrows from all nodes to other nodes demonstrate that no hierarchy is required although one may exist.*

A modification of how behaviour is expressed in the framework, and consequently indicated in the framework as a diagram, is therefore required. However, before undertaking this, a number of additional conceptual models need to be mentioned as sources that have been key in the formation of the framework from this point onwards. The models have helped to conceptualise how behaviour can be visualised as an emergent property of any number of nodes and indeed node types. They include: Sandra Ball-Rokeach and Melvin Defleur's media system dependency conceptual model (1976) (Fig. 4.3.2); the FRISCO report's development of the semiotic triangle as a semiotic tetrahedron (Falkenberg, *et al.*, 1998) (Fig. 4.3.3); and most importantly Fritjof Capra's matter, form, process and meaning visualised as a tetrahedron (2003, pp. 62–64) (Fig. 4.3.4).

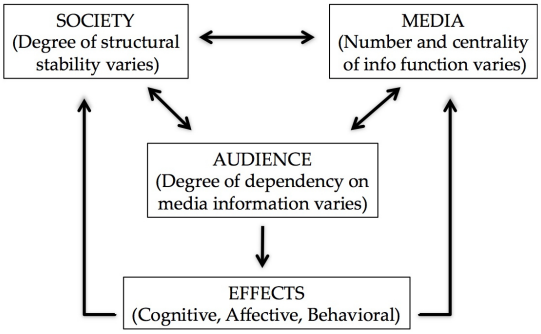

Figure 4.3.2: *Sandra Ball-Rokeach and Melvin Defleur's media system dependency conceptual model (Wikipedia, 2012).*

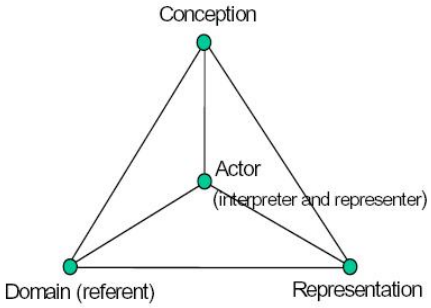

Figure 4.3.3: *The FRISCO report's semiotic tetrahedron (Falkenberg et al., 1978, p. 3).*

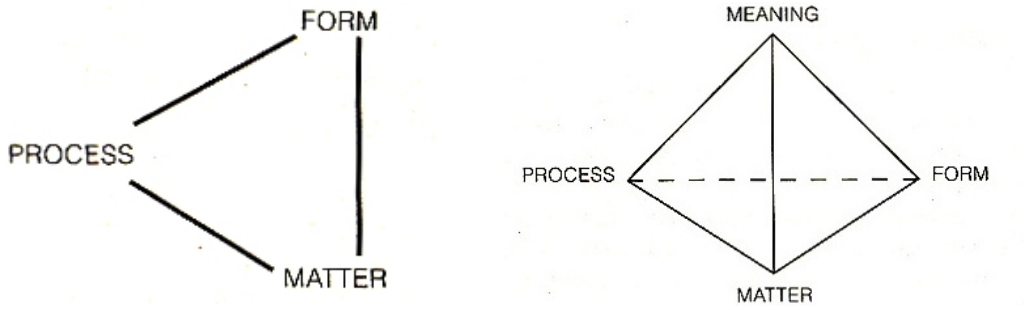

Figure 4.3.4: *Left, Fritjof Capra's matter, form and process visualised as a triangle and right meaning visualised as an emergent property transforming the triangle into a tetrahedron (2002, p. 71; ibid, p. 74).*

In each of these models, there are four nodes with the fourth node presented as a convergence of the other nodes. This convergence may be indirect as in the media system dependency conceptual model where the node effects, shown as the bottom point of the diagram, receives from other nodes via audience but then sends directly back to all nodes except audience. Equally, it may be direct such as the node actor shown centrally in the FRISCO report's semiotic tetrahedron or the node meaning shown as the top centre point of Capra's tetrahedron. In both of these models, the fourth node is connected to all other nodes by being positioned centrally. The fourth node in all three models can, therefore, be considered as an emergent property of other nodes. Emergence is visualised through a vertical hierarchy, descending in the media system dependency conceptual model and ascending in Capra's tetrahedron, or a hierarchy that radiates out from a central point as employed in the FRISCO

report's semiotic tetrahedron.

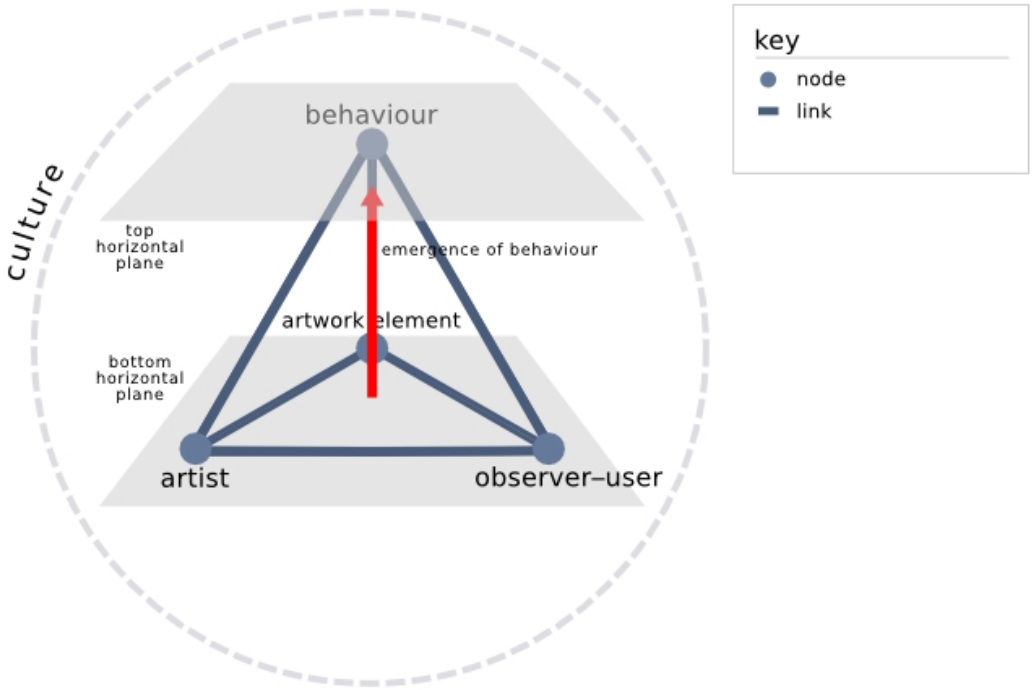

Figure 4.3.5: *The framework of networked art shown as a tetrahedron with behaviour as an emergent property of artist, artwork element and observer–user. The red arrow indicates the emergence of behaviour.*

Similar to the models discussed above, a tetrahedron is employed to modify the framework of networked art and add a fourth node. The framework's fourth node is behaviour. As an emergent property of the nodes of artist, artwork element and observer–user it is a consequence of their initial arrangement and the outcome of their ongoing communication through cognitive and action events. As such, it is equivalent to both effect in the media system dependency conceptual model and meaning in Capra's tetrahedron. Just as the Conceptual Framework of Art was explained as a three-dimensional tetrahedron (see chapter 4.2 and Fig. 4.2.3), viewed from thirty degrees above the x-z plane with its nodes positioned on horizontal and vertical planes, so too is the framework of networked art. In order to understand it as such, it requires a transformation of the diagram from a triangle in Figure 4.3.1, specifically a rotation sixty degrees backwards along the x-axis and the

addition of behaviour as the top emerging node, to a tetrahedron in Figure 4.3.5. The transformation is animated from Stage 5.00 to 6.00 of the model.

In the framework as a tetrahedron the nodes of artist, artwork element and observer–user occupy the same bottom horizontal plane while behaviour, the emergent property of the nodes, occupies a top horizontal plane. Emergence is indicated in Figure 4.3.5 and Stage 6.00 of the model by a red arrow. However, viewed from the perspective of behaviour, that is ninety degrees above the x-z plane or from the top horizontal plane downwards, behaviour is also positioned centrally within the other three nodes of the framework. In this way, behaviour is simultaneously separated out from and yet between those nodes. It is fundamentally distinct from them and yet remains linked to them. Behaviour is represented in this way, similar to how Capra explains the position of meaning in his tetrahedron, in order “to indicate that it opens up a new 'inner' dimension” (Capra, 2002, p. 74) of the framework.

Within the context of the framework as a network as diagram, Deleuze and Guattari's proposal of a diagram as a plan employed to create with rather than an image that represents (Watson, 2009, p. 12) aligns itself with the general transition of pre-systems studies networks having a visual basis to post-systems studies networks having a functional basis (see chapter 1). Additionally, as argued in chapter 4.2, arrangement as a process supports post-systems studies networks having a functional basis because nodes are arranged to structure and enable a networked artwork. Behaviour can also be said to support the functional basis of networks. Nodes behave, either through a cognitive or action event, with a purpose of communication. The combination of the network as a diagram that has a functional basis with arrangement and behaviour as consisting of events to enable that functional basis also support an important aspect of networked art. That is, that *networked art is fundamentally process-based* for all nodes in both sequential stages of arrangement and behaviour.

The processes of cognitive and action events in arrangement enable the artist to create or identify nodes and provide the starting point of a networked artwork (see chapter 4.2). Behaviour, as discussed above, enables nodes to rearrange other nodes in a networked artwork through the processes of cognitive and action events.

In a cognitive event, the observer–user interprets the artwork (see chapter 4.1) enabling them to cognitively rearrange and thereby reinterpret nodes as they choose. The combination of interpretation with reinterpretations yields meaning for the observer–user. In an action event, however, the observer–user can, in addition to the cognitive event and its processes, rearrange nodes in the artwork in an observable way adding additional meaning for themselves as well as subsequent observer–users. Non-cognitive nodes also employ action events in networked art. Through action events they too rearrange and link nodes, however, they have neither the ability to initiate a cognitive event or be provided with meaning as a result of either type of behaviour since meaning signifies cognitive ability. Common to each of these scenarios of arrangement and behaviour, it is the processes of cognitive and action events that create or reconfigure the network that is networked art. As a result of arrangement followed by ongoing behaviour, networked art can be said to be a form of art that is a process of perpetual becoming. It is similar to Bourriaud's conception of relational art (2002, p. 96) and Umberto Eco's open work (Bishop, 2007, p. 50) discussed in chapter 3.4. Applying Deleuze and Guattari's understanding of a diagram, networked art is, in a continually ongoing manner, a plan to create with rather than an image that represents a final fixed state.

Arrangement and behaviour unquestionably raise the issue of authorship in networked art, specifically whether the role of the observer–user poses a threat to an artist's authorship and as a result of this the means of an artwork's creation. As such, this indicates that networked art continues an active engagement with what I have termed as the grand-project of the modern era (see chapter 3.1). Both new media art and relational art can in a sense be classified as informational forms, which in the tradition of conceptual art shift the artwork from an object-orientated basis to a conceptual basis. In the terminology of the framework of network art, conceptual art does this by allowing the observer a *cognitive event* with the artwork while both new media art and relational art generally allow the user an *action event* with the artwork in addition to a *cognitive event*. As a result, the form of conceptual art, new media art and relational art can each be viewed as being dictated by what Dinkla terms the “media educated public” (1994) of contemporary culture who wish to 'read' and frequently manipulate the information contained within an artwork. The artwork in these contexts can in effect be said to have a functional basis.

Following these developments in conceptual art, new media art and relational art, does a desire on the part of the artist in networked art to share authorship and a need on the part of the observer–user as a social being to behave, cognitively or through action, dictate an informational and therefore functional basis of an artwork? Alternatively, is it the functional basis of a networked artwork that has facilitated reconfigurations of the roles of artist and observer–user? In systems studies, it is clear that a need to organise information was the basis for the creation of a means through which it could be organised. A computer system is an example of such means of organising, which as a form then dictated the strategy of organisation. However, can the same be said for the adoption of arrangement and behaviour regarding the artwork in networked art? Does networked art as a form dictate arrangement and behaviour and the processes of cognitive and action events employed as strategies of practice, observation and use? Alternatively, is it artists responding to developments in science and media that enables arrangement and behaviour to dictate networked art's form and content?

These are highly complex questions about networked art which cannot and do not need to be resolved within the scope of outlining the framework. However, the questions do require acknowledgement as the result of a paradigm that has emerged from contemporary art to understand the art historical context of networked art and why arrangement and behaviour are so important to the framework of networked art. There is no turning back from the 'activation' of the observer that transforms them into a user. Terms such as participation, interaction and relationality are already well-developed and integrated into contemporary art practice. Cognitive and action events in networked art as part of arrangement and behaviour are therefore a necessity, not just as a means of engaging with the art historical context of networked art and in particular the grand-project of the modern era, but as fundamental to the operation of networked art.

The crucial difference between cognitive and action events within arrangement and behaviour in networked art and participation, interaction and relationality in other art forms such as new media art and relational art is that historically, correctly or incorrectly, participation, interaction and relationality have often been considered one

of the artwork's "'value added' characteristics" (Lister, *et al.*, 2003, p. 20). Consequently, the user in new media art and relational art has been understood as an advancement of the role of the observer while the actions they engage in, the former active and the latter passive, are considered opposites. In networked art, the role of the observer part of the observer–user is positioned and valued as being of equal importance as the user. By connecting observer and user in the framework, as discussed in chapter 4.2 (Fig. 4.2.11 and Stage 4.00 of the model), as observer–user they signify and typographically visualise a continuum of behaviour. The cognitive or action event an observer–user engages in are therefore not binary opposites but related and frequently complementary events which compose behaviour.

The roles of artist and user in new media art and relational art overlap or share similarities in terms of authorship as do artist and the user part of the observer–user in networked art. However, by explaining artist and user in networked art as part of sequential stages of the artwork, the former *arranging the artwork* followed by the latter as well as potentially the former *behaving within the artwork*, it becomes clear as to how the roles are nevertheless distinct. If both roles of the observer–user, that is observer and user, are of equal importance in networked art then the roles of artist and the observer part of the observer–user must also overlap as the roles of artist and user do. While artist and user overlap because they both engage in action events, artist and observer overlap as a result of cognitive events.

Issues of authorship in art forms such as new media art have been almost exclusively discussed from an action event perspective, that is that by using an artwork a user changes it in ways similar to the artist's creation of the artwork (see chapter 3.3). By focusing discussion on the action event of interaction the consideration of cognitive events has been largely omitted. As a consequence, discussion is, intentionally or unintentionally, a biased consideration of the processes that occur within authorship. Furthermore, discussions broadly suggest that the behaviour of observer and user, presented as thinking and doing, or in the terminology of networked art, cognitive and action events, are binary opposites and consequently create what is, in reality, a false dichotomy of roles. Cognitive and action events cannot be assigned to roles in this exclusive and simplistic way. The continuum of observer–user in networked art does not favour either an action or

cognitive event. It instead acknowledges the relationship between observer and user, chronologically in terms of the overall development of contemporary art and their order of application within networked artworks, and therefore does not permit a dichotomy of roles. The overlap of artist and observer through a cognitive event as equivalent to the overlap of artist and user through an action event does, however, raise the question of whether the issue of authorship, expanded to acknowledge cognitive events, is, in fact, new and particular to forms of art of the modern era.

Sculptures for Distant Places (Lynch, 2014–16), the third of my artworks created as part of this research, provides an example of behaviour between multiple configurations of observer–user and artwork element nodes. The artwork consists of a series of three single-screen works that are conceived to be exhibited together as a gallery installation. Individually, the works are titled *Sculpture for Mountains*, *Sculpture for Lakes* and *Sculpture for Forests*. Each work employs a networked application that retrieves a unique live webcam video feed of a location in the world. A 'virtual' sculpture consisting of a 3D form with impossible or unconventional qualities is created and positioned within the space of each video in such a way as to yield a convincingly realistic scene overall but that could not exist outside of a 'virtual' context. The sculptures have animated surfaces, the ability to float in mid-air, change according to interaction and data, respond to and generate sound. All three compiled scenes, partially 'real' and live, partially 'virtual' and generated, are then projected alongside each other in an exhibition space.

The 'virtual' sculpture in *Sculpture for Mountains* (Fig. 4.3.6) is a large tilted square plane resembling a sheet of silver coloured metal. Floating over the Canadian Rocky Mountains the sculpture's surface reflects the mountain range. Light from the scene affects the quality of the image displayed on the sculpture. The sculpture is initially static. However, sound created within the exhibition space warps the sculpture, transforming it and the view seen on its surface. The sculpture warps dependent on the level of sound giving a wider yet more distorted view of the mountain range. Sound captured by the work is also distorted and played back to the observer–user as part of a sonic composition generated by the artwork. While an observer–user can behave with the sculpture through a sound-based action event to provide a wider view of the mountain range and input to the sonic composition, the more frequent or

intense their action event is, the less they see and hear clearly as the view and sound becomes distorted.

Figure 4.3.6: *Sculptures for Distant Places: Sculpture for Mountains (Lynch, 2014–16).*

In *Sculpture for Lakes* (Fig. 4.3.7) the 'virtual' sculpture consists of a vertical flat disc of animated translucent material with a circle cut through it. Twenty stones are placed in a circle orbiting the disc. The sculpture floats over the lake in front of Kinkaku-ji, the Golden Pavilion Temple, in Kyoto, Japan. Behaviour occurs in *Sculpture for Lakes* between the location and the sculpture through action events, that is between location and sculpture as artwork elements within the artwork. The time of the distant location is retrieved from the internet, and this is employed to transform the sculpture continually. The circular cut out is vertically positioned within the disc tracking the movement of the sun, rising from the bottom of the disc to the top of the disc at midday and then descending until it disappears out of view at sunset. The stones also animate in various ways, spinning on their axis, around the disc, contracting and expanding throughout the day. At night they descend to float

motionlessly in the lake. Colour from the location is used to texture and animate the surface of the disc. The surface is brightest and most textured when the sun is at its zenith as well as during the summer months. A sonic composition is generated by the artwork from the combination of several programmed instruments that are inspired by traditional Japanese music. The instruments are juxtaposed and overlaid in various ways throughout the day while at night become calmer and monotone.

Figure 4.3.7: *Sculptures for Distant Places: Sculpture for Lakes (Lynch, 2014–16).*

The 'virtual' sculpture in *Sculpture for Forests* (Fig. 4.3.8) is positioned in the Šumava National Park in the Czech Republic. The sculpture is composed of three triangular-based forms assembled on top of each other and intended to resemble icons that signify a tree or a forest. The base of the sculpture, its trunk, is brown. Several of the sculpture's upper surfaces are covered in triangular-shaped leaves that are green while the colour of other surfaces is influenced by the surrounding landscape and seasons. The sculpture's triangular leaves constantly shimmer and animate, however, when motion is created within the exhibition space the sculpture animates through a series of faster more agitated patterns, gradually returning to their regular

animation once the movement has ceased. In this way, the sculpture sees and reacts to the behaviours of the distant landscape it is embedded within as well as the observer–user. In the case of the former's behaviour, they are unintentional action events while in the case of the latter they are intentional action events.

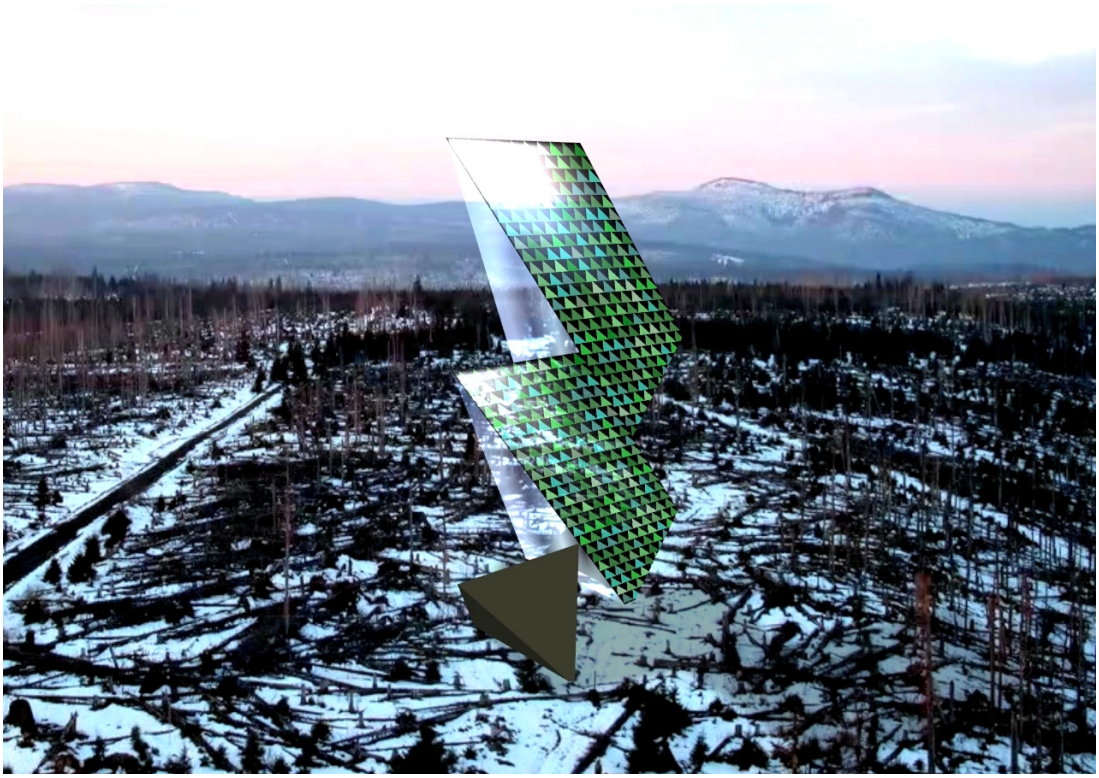

Figure 4.3.8: *Sculptures for Distant Places: Sculpture for Forests (Lynch, 2014–16).*

Sculptures for Distant Places affords an observer–user a view of a distant location through a network and combines it with a generated sculpture as a response to that location. Each work serves simultaneously as a window from the gallery onto a landscape, in effect linking the two spaces as nodes within the artwork, as well as a means to transform how that landscape is observed and heard. In all three works an observer–user behaves through a *one-way cognitive event* with the sculpture in the distant location. While the scenario of each work is unique, the observer–user's process of observation, hearing and resulting behaviour as a cognitive event is relatively similar. However, all three works are also arranged to encourage primarily *two-way action events* between their nodes. These include sound, movement and

data-based action events between observer–users and artwork elements such as the 'virtual' sculptures, locations and the technology, both hardware and software, employed.

In addition to *Sculpture for Mountains*, *Sculpture for Lakes* and *Sculpture for Forests* all containing nodes they are also each a node of the artwork *Sculptures for Distant Places* as a whole. Specifically, they are *artwork elements that are networks as nodes*. Being a network as node is demonstrated by not only allowing the artworks to individually behave with observer–users and distant locations but also potentially with each other within the gallery space. *Sculpture for Mountains* and *Sculpture for Forests* respectively hear and see everything within the gallery space and so do not discriminate between observer–user sounds, sights and those produced by other works.

As a consequence of how it is employed and the importance it plays, behaviour in *Sculptures for Distant Places* significantly rearranges nodes and their relationship with each other within each work and the artwork as a whole. Action events, in particular, change the sculptures in observable ways, feeding back to how the location is depicted and observer–users who can initiate subsequent action events to continue the cycle of behaviour. Behaviour in *Sculptures for Distant Places* can, therefore, be understood as an *emergent property* of nodes that transform the arranged spaces of gallery and landscape, local and distant spaces, into a hybridised new space. The new space is an in-between space, created by and a manifestation of the network present in the networked artwork.

> A “space of encounter”, rather than “a space of representation” (Basu and MacDonald, 2007, p. 14).

4.4 Space (& time)

Space is the fourth and final of the key principles of the framework of networked art and is discussed in this section. Similar to behaviour, space comes into being once a networked artwork's nodes are arranged and the artwork exists. There are four types of *generalised space* in networked art and of key importance to the framework. Two are primary types of space, one of which can be subdivided into two secondary types of space (Fig. 4.4.1 and Stage 8.00 of the model). A networked artwork's primary types of space are the space *within and without or outside the artwork*. Space within the artwork is referred to as *internodal space*. Space without the artwork, which must exist if there is to be a within, has already been mentioned in chapter 4.2 as *culture*.

In chapter 4.2 culture is described as the total context within which an artwork exists and is depicted in Figure 4.2.11 and Stage 3.00 of the model as a circle encompassing the framework. With the addition of behaviour (see chapter 4.3) the framework becomes a tetrahedron and culture becomes a sphere. Since the framework is a conceptual model as well as a generalisation of all networked art the transformation of two-dimensional shapes of triangle and circle into three-dimensional shapes of tetrahedron and sphere must mean networked art is, in part at least, spatial. Examples of how networked art can be spatial are already demonstrated in the artworks *A network of people who attended an exhibition and contributed to the creation of this work*, *Transformations: Actions to Matter / Matter to Actions* and *Sculptures for Distant Places* discussed earlier in this chapter. Behaviour within each of these examples can occur in spaces such as a gallery or public space, yet they are arranged as a result of networked and digital spaces connecting geographically separated or distant nodes. As a context, culture informs all networked artworks, and in turn, the artworks contribute to culture. In the three examples mentioned the culture of art and gallery attendance, the culture of the 'free stuff' online community and mass-produced items or the culture of constructed and

natural environments inform each of the artworks. In turn, the artworks then contribute to culture through various strategies such as visualisation, appropriation and transformation. A networked artwork is, therefore, itself a node contributing to the space of culture, the network it resides within, and demonstrates self-similarity or levels of networks (Vitale, 2014) in networked art where even the artwork is a network as node existing within culture as a network.

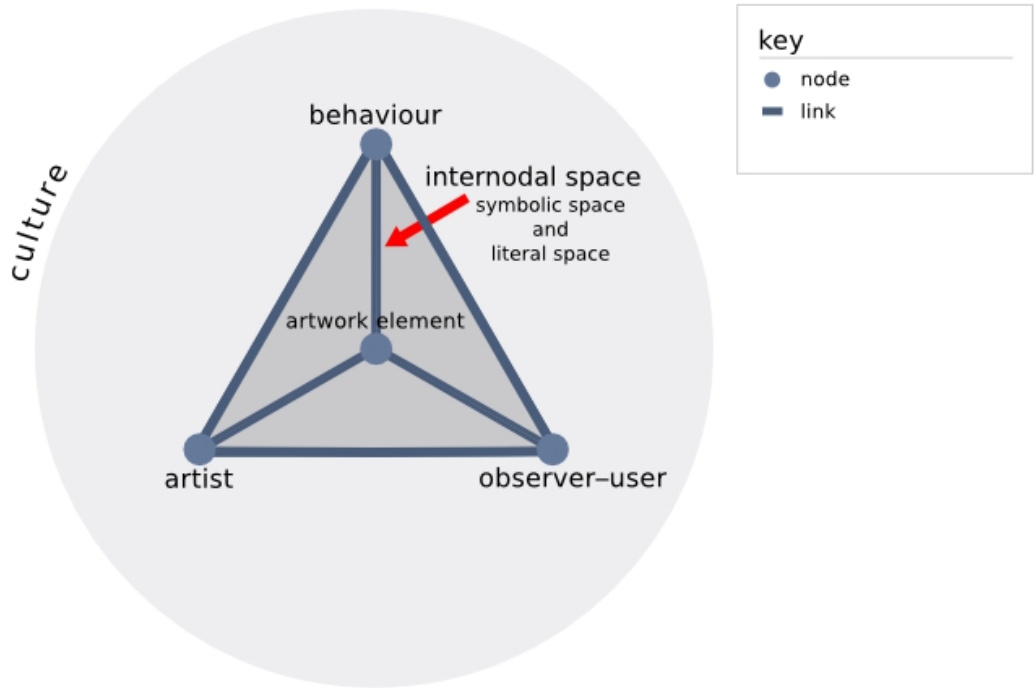

Figure 4.4.1: *The framework of networked art's primary types of space, culture and internodal space, and secondary types of space, symbolic and literal space.*

While acknowledging the role that culture plays in networked art, the focus of this section is the internodal space within networked art. Cognitive and action events are possible in arrangement and behaviour within a networked artwork, and a cognitive event occurs in a cognitive space while an action event occurs within an existing space (see chapter 4.2). Therefore it follows that the two secondary types of space within internodal space are a cognitive and existing space or what are respectively termed a *symbolic space* and a *literal space* (Fig. 4.4.1 and Stage 8.00 of the model). Space's relationship with arrangement and behaviour can be understood as

reciprocative. Space allows arrangement and behaviour to occur within it, that is it allows the creation and identification of nodes, which can subsequently have cognitive or action events together. However, cognitive and action events give space its characteristics, including whether space is symbolic or literal, thereby defining the space.

There are numerous other types of space within the four types of generalised space of culture, internodal, symbolic and literal space. These are specific types of space that are a direct result of arrangement and behaviour and the characteristics they give to space. Specific types of space include pictorial, figurative, social, digital, augmented spaces and so forth. All specific types of space can be considered as occupying a position on a continuum somewhere between symbolic and literal space. Each can be given a term such as conceptual, imaginary, three-dimensional, physical and of course 'virtual' and 'real' as an indication of that position. The configuration of a specific space may be particular to a specific networked artwork. As such, it is not necessary to discuss each specific type of space as it will not necessarily apply to all examples of networked art and therefore to the framework as a generalisation of all networked art. Instead, it is the internodal spaces of symbolic space and literal space, those which contain all specific types of space and therefore facilitate all possible networked artworks, which are of key importance.

When a cognitive event occurs, the term space is employed symbolically. Symbolic space refers to the context within which any form of difference or inequality that facilitates a cognitive event among nodes occurs. If nodes are equal in a cognitive event, they have the same information and as such cognitive events between them will be scarce or non-existent. When an action event occurs between nodes, space is employed literally. A literal space is an area within which nodes are situated, specifically it is composed of their presence at two locations and the void between their locations, which facilitates an action event among nodes. Literal space is therefore three-dimensional or Euclidean and defined by either the presence of nodes, which are materially manifested, or their absence. In both symbolic and literal spaces all nodes possess difference or inequality from each other. In a symbolic space, nodes are differentiated from each other by the information they contain. Informational inequality enables richer cognitive events between nodes. The

information and how the node can apply it effectively amounts to a node being cognitive or non-cognitive. In a literal space, nodes are differentiated from each other by location, that is by not occupying the same literal space. This locational inequality contributes to nodes ability to be able to engage in action events.

As mentioned in chapter 4.3 the nodes of artist, artwork element and observer–user occupy a bottom horizontal plane while behaviour occupies a top horizontal plane. Behaviour is an emergent property of the nodes artist, artwork element and observer–user and its separation onto a top horizontal plane can be understood as such. The separation onto planes, however, can also be understood as a means of spatially grouping nodes within the framework according to qualities and abilities. Nodes are, as already discussed, cognitive or non-cognitive. However, they may also be material and have qualities such as dimensions, volume, weight, texture and so forth that are associated with literal space or be immaterial. The addition of two vertical planes, a front and back plane intersecting the bottom and top horizontal planes, can be employed to help explain this.

The nodes artist, artwork element and observer–user are all existing nodes. Artist and observer–user at the front of the bottom horizontal plane are material. However, an artwork element at the back of the bottom horizontal plane may, for example, be information-based, so it can be material or immaterial. Action of some sort must occur in order to bring a networked artwork into existence (see chapter 4.1). The same applies to artwork element nodes. So regardless of whether an artwork element is 'real' or 'virtual', it exists. To indicate that artist, artwork element and observer–user exist they all occupy the bottom horizontal plane (Fig. 4.3.5 and Stage 6.10 of the model). Artist and observer–user are cognitive and so in addition to occupying the bottom horizontal plane, they also occupy the front vertical plane (Fig. 4.4.2 and Stage 6.60 of the model). Artwork element is non-cognitive and is therefore indicated as also occupying the back vertical plane (Fig. 4.4.2 and Stage 6.85 of the model). Behaviour, the fourth node of the framework, is an emergent property of the other three nodes. It exists, however, it cannot be classified by employing material or immaterial categorisations as it is event-based and occurs within both symbolic and literal spaces. It is separated out onto a top horizontal plane above the bottom horizontal plane, runs parallel to it and effectively forms a

layer over it (Fig. 4.3.5 and Stage 6.35 of the model). As such the top horizontal plane not only indicates behaviour as emergent from other nodes in the framework but also its occurrence across symbolic and literal spaces. Since behaviour occupies a midpoint between the two vertical planes of cognitive and non-cognitive nodes it is neither cognitive nor non-cognitive but instead in-between, the result of combinations of cognitive and/or non-cognitive nodes.

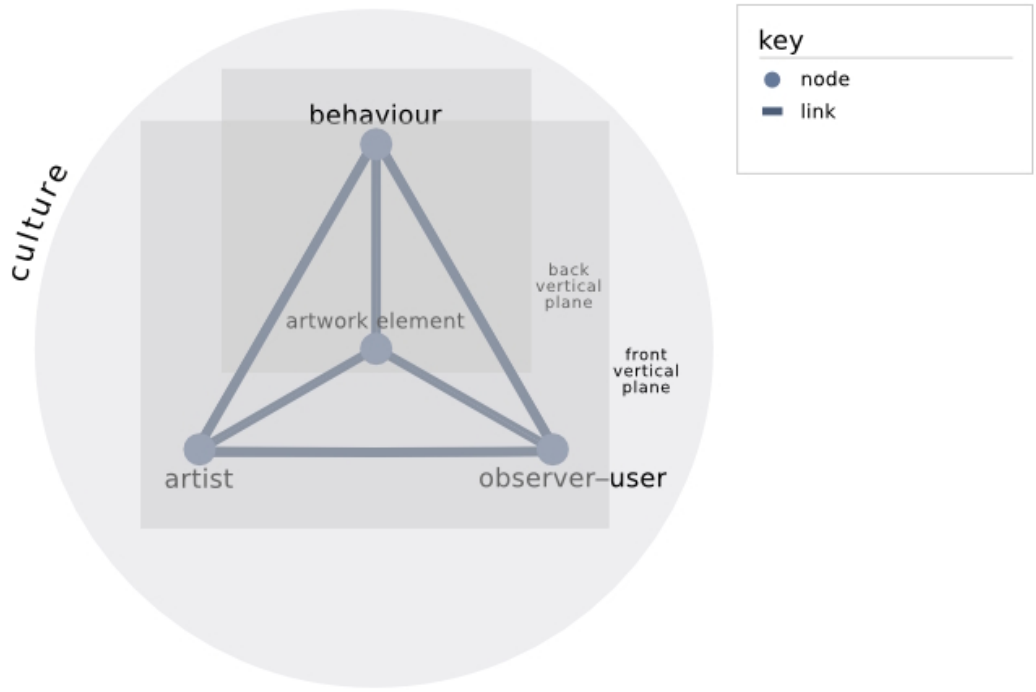

Figure 4.4.2: *The framework of networked art's placement of nodes on vertical planes. The cognitive nodes of artist and observer–user occupy the front vertical plane. The non-cognitive node of artwork element occupies the back vertical plane.*

Nodes within a networked artwork should not be considered static or fixed in either symbolic or literal space and immutable throughout the existence of the artwork. In order to conform to basic principles of networks such as allowing nodes to change and be added or removed from a network, this must be considered as valid. Within a networked artwork, static or fixed nodes would restrict arrangement and behaviour, effectively how the artwork is conceived, exhibited and performed. This restriction would undermine the framework's flexibility and its ability to be applied usefully. To

allow flexibility the framework consequently defines only the initial relationship nodes have with each other, that is the point at which arrangement has completed and behaviour can commence, as well as their general relationship with each other. Additionally, the framework only defines a singular example of each of the four node types that are simplified or abstracted to represent a general node of each type.

The horizontal and vertical planes discussed above should be understood as a guide to how nodes share or differ in qualities and how they can be delimited within the context of the initial and general relationship of nodes. The terms used in the description of the planes as top, bottom, front, back, horizontal and vertical, are only to distinguish each plane from another in the three-dimensional space necessary to demonstrate the framework as a network as diagram. The positioning of nodes along planes and the terms employed to name the planes serve to clarify the initial and general relationship of nodes and not to indicate any fixed spatial order or hierarchy. The ability of nodes to move once the artwork is arranged is implied in the interactive animated model (Interactive Mode tab of the model), which allows the observer–user to rotate and zoom the framework along any axis enabling viewing from any angle. A networked artwork, therefore, does not by necessity have a hierarchy between nodes as a result of having or not having material qualities, cognitive or non-cognitive abilities, although such a hierarchy may exist.

Nodes can therefore move and change once the networked artwork is arranged and behaviour commences; effectively once the networked artwork exists. While this change occurs in the networked artwork and not in the framework, it can be said to perhaps question the naming of nodes in the framework, in particular, the artist, artwork element and observer–user, their identity and why they need to be distinguished from each other. If nodes can change when behaving, then it is conceivable that a non-cognitive node could, for example, become a cognitive node.[102] This change from non-cognitive to cognitive has already been suggested as a future scenario (see chapter 4.1). It has been argued that the coincidence of cognitive or non-cognitive with social or non-social nodes is not fixed and immutable

102 It is also possible that a cognitive node could become a non-cognitive node. However, this would be considered an anomalous outcome within a network, the result of a network that had poor cognitive events, leading to entropy and the network's discontinuation.

and will no doubt change at some point in the future as artificial forms capable of cognition are developed. Consequently, it is plausible that an artificial form capable of cognition could be developed as a result of behaviour within a networked artwork. After all, this is the purpose of neural networks employed in cognitive science and as discussed above information inequality of nodes involved in cognitive events enables richer cognitive events. This scenario is in effect the communication of information or what could be termed as a teaching and learning scenario between nodes. The ability of nodes to change through behaviour is essential in enabling flexibility within a networked artwork and ensuring its continuation. It supports, for example, the ability of the artist to occupy the role of artist as observer and artist as user as part of the practice of networked art (see chapter 4.1) and the overlapping of roles of artist and observer–user (see chapter 4.3). If nodes change then their relationships, the links within the networked artwork, will also change ultimately reconfiguring the space of the networked artwork. Nodal change ensures that the space of the networked artwork functions as space should, that it is dynamic and not static or fixed.

I now return to a discussion raised in this chapter's introduction and subsequently referred to throughout the chapter concerning the framework of networked art's use of diagrams. This discussion has a particular bearing on the framework's space and how it is perceived. The discussion's premise is that diagrams are a plan employed to create with rather than an image that represents what has already been created and cites Deleuze and Guattari's definition of a diagram as the basis for this (Watson, 2009, p. 12). Within this context, the diagrams of the framework are considered a plan for the conception of both writing and artworks and have steadily evolved over the course of this chapter. As such, the framework is termed a network as diagram. It is a working network with symbolic space that represents all possible cognitive events and literal space that represents all possible action events in all possible networked artworks.

The concept of a diagram as a plan, in effect a tool, and yet simultaneously representing what is planned has precedents in science. Katja Mayer discusses this as the “inseparability of representation and calculation, of idea and its materiality” (2013, p. 17) and refers to several examples of its occurrence. These include James

Joseph Sylvester's discussion of atomicity as an instrument (1878 cited in Mayer, 2013), Bruno Latour and Steve Woolgar's discussion of representational techniques referred to as “inscription devices” (1979 cited in Mayer, 2007) and Hans Diebner's “diagnostic images” as both “apparati and results” (2006 cited in *ibid*). Mayer goes to great lengths to trace a history of visualised networks as functional and representative citing weaving looms, puzzle and game structures, biology, chemistry, sociometry and infrastructural topologies such as canals and railroads as examples (2013). Several of these examples are discussed in chapter 2.1 where it was argued that the pre-history of networks was visual, initially representational, and over time gradually became more functional. The framework as a network as diagram can be understood to continue the twentieth-century consideration of networks as functional. However, rather than the concept of a network transposed from thought or existence, cognition or action, symbolic or literal space, through language to a diagram that then becomes functional, as has frequently been the case, it is argued that the framework is simultaneously conceived and created diagrammatically.

The framework as a network as diagram nevertheless creates some spatial issues. The framework is visualised as if seen from without, not within. However, all nodes of a networked artwork are by definition within a networked artwork including the artist and observer–user (see chapter 4.3) who are the only two cognitive nodes that can employ the framework either in practice or to understand practice. Without and within points of view of the framework distinguish it between being solely a diagrammatic network, that is a diagram that is representational of a network's space, and a network as diagram, which applies Deleuze and Guattari's proposal of a diagram as a map or a plan employed to create with (Watson, 2009, p. 12). A diagrammatic network is according to Mayer generally a simplified abstract view of a network as if seen from without, outside or above (2013) and the framework as a network as diagram conforms to this view. Diagrammatic networks perform the function of mapping the relationships between nodes in much the same way as a flow chart maps the relationship between actions or events. They provide a view of the whole but usually little detail of the individual nodes in the network. By definition, a diagrammatic network is not immersive for its cognitive nodes.

By being within a networked artwork cognitive nodes experience a networked artwork

from within, they are immersed in its space. Immersive networks aspire to be as immersive as possible for cognitive nodes and may be figurative, as in the case of many 'virtual' spaces in new media, or literal, as with 'real' spaces in relational art, in how this is achieved. They do not afford a view of the whole but rather a view from within the space of the network. The two points of view of without and within networks, or rather how a network is experienced, can be summarised as essentially *seeing the network* or *being within the network*. The experience of the framework as a network as diagram is of seeing the network, however, the experience of a networked artwork is of being within the network. So the point of view of the framework and the point of view of a networked artwork do not coincide. This difference is an issue since the framework is intended in part to be a generalised model of all networked artworks.

As well as being an impossible point of view for the artist and observer–user, the framework as a network as diagram seen from without causes numerous other spatial and temporal issues for its nodes. Bourdieu expresses similar concerns when he questions the usefulness of diagrams for genealogy:

> “The family tree, a spatial diagram that can be taken in at a glance, uno intuitu, and scanned indifferently in any direction from any point causes the complete network of kinship relations over several generations to exist in the mode of temporal existence which is that of theoretical objects, that is, tota simul, as a totality in simultaneity. It puts on the same footing official relationships, which, for lack of regular maintenance, tend to become what they are for the geneaologist [*sic*], that is, theoretical relationships, like abandoned roads on an old map” (1990 cited in Mayer, 2013, p. 19).

These criticisms of collapsed space, time and as a result, the simplification of what is diagrammed can be said to apply to all networks visualised as diagrams, primarily because they are often transposed from thought or existence, cognition or action, symbolic or literal space through language to a diagram.

The framework as a network as diagram is not transposed. It has been conceived and created as a diagram, and therefore the diagram is the framework. Regardless

of this Bourdieu's criticisms of collapsed space, time and simplification also apply to the framework. The framework, however, is not simply the final illustrated diagram (Figs. 4.3.5, 4.4.1, 4.4.2 and Stage 8.00 of the model). It includes all stages of its construction, the demonstration of the processes of arrangement and behaviour and the ordering of its parts that have been discussed throughout this chapter. Arrangement and behaviour and their ordering one after the other are temporal, and the framework even contains temporality within the node observer–user. So temporality is inseparable from the construction of the space of the framework. This inseparability is demonstrated by the utilisation of a series of diagrams in this research rather than a single diagram, which are intended to develop and describe the framework progressively. However, it is visualised more clearly through the use of a timeline in the interactive animated model. No singular figure would be sufficient to explain the framework's temporality. Instead, by using a timeline in the animated and interactive model, the issues of Bourdieu's collapsed space and time in the framework as a network as diagram are to some extent resolved. The timeline animates the framework's development including progression from arrangement to behaviour, the relationship between cognitive and action events and the roles of observer and user in observer–user. Despite this Bourdieu's criticism of the simplification of what is diagrammed unfortunately remains.

There are, however, a number of reasons as to why the framework is and should be visualised as a diagrammatic network as if seen from without regardless of the position of the artist and observer–user. First and foremost diagrams are entrenched in the histories and conventions of two fields, science and art. Prior to systems theory observers in science were considered to be without a system, that is outside of the system, observing not participating and therefore impartial (see chapter 2.3). Diagrams were used to illustrate systems as if seen from this point of view by employing shapes such as circles and lines, effectively nodes and links, that represented things and their relationship as if seen from without, outside or above. From second-order cybernetics and systems theory onwards observers were acknowledged to be within the system they observed, however, diagrams continued to illustrate systems as if observed from without. In art prior to the modern era, there was a similar paradigm to the observer in science (see chapter 3.1). Ascott terms this the Renaissance paradigm, that is “the artist standing apart from the world and

depicting it and the observer standing outside of the artwork and receiving this depiction" (1988, p. 215). The observer in this paradigm is epitomised in Bullough's coined term Psychical Distance (1912). It describes observers as cognitively detached from an artwork, often reinforced by a physical distance in literal space such as art institutions restrictions on touching artworks, and consequently, the artwork in a sense becomes revered. Since both fields of science and art placed scientist/artist/observer outside of what is observed/created and diagrams conformed to this, the point of view of seen from without was by the twentieth century the adopted convention. Regardless of the spatial paradox that the point of view of seen from without poses, diagrams continued to employ this convention within the twentieth century and it is now used across an ever-increasing number of fields.

As mentioned above, diagrams are also simplified abstract views. They are generally conceived in much the same way as maps, which are subjective or objective (see chapter 2.1), that is reductive representations of spatial relationships between things. Diagrams employ the point of view of seen from without and often from above because it is equally a principle employed in maps. While the framework is a network as diagram and not transposed from symbolic or literal space to be represented in a diagram, it retains its ability to be representational as a generalised model of all networked artworks by being simplified and abstract. Seeing the framework as if seen from without, even though spatially paradoxical, is, therefore, building on long-established and widely understood conventions that are no more paradoxical than it is to refer to a map to navigate a space that we may currently occupy. Additionally, just as a map is not a territory, the framework as a network as diagram is not a networked artwork. Simplification can, therefore, be understood to be the natural state of a diagram in order to facilitate communication. It is necessary for a diagram to afford a view of the whole. Combined with the point of view of seen from without, this facilitates the framework as a network as diagram to be employed as a plan to arrange for artists and a plan to behave for observer–users.

The Distinction Between Here and There, Now and Then (Lynch, 2013 c), another of my artworks created as part of this research, provides an example of symbolic and literal space within a networked artwork's internodal space. It consists of a performance enacted twice in 'real' and 'virtual' spaces that are folded together

through the subject matter and documentation of the performance. The performance is documented as a diptych with an accompanying series of ten framed artefacts (Fig. 4.4.3) produced during the performance enactments, which are then exhibited as a gallery installation. The title of the artwork is based on a quote from an article by Kathy O'Dell (1997) which in turn refers to Roland Barthes essay 'Rhetoric of the Image' (1977). O'Dell discusses the boundaries between reality, representation and documentation in contemporary art and how artworks are often informed by the way they will be viewed through documentation. O'Dell refers to Gina Pane's performance *Discours Mou et Mat* as an example stating that:

> "edges demarcate the spatial and temporal distinction at the base of all representation — the distinction between here and there, now and then. Pane was keenly aware that the performance of an action and its photographic image may be different in spatiotemporal terms, but that the former is ultimately defined by the latter" (1997, p. 76).

Similarly, in *The Distinction* it is this awareness of the observer–users mode of seeing the performance, that is their behaviour as a cognitive event of seeing it through documentation, as well as the literal space of a gallery within which it is seen that informed my initial arrangement of how the performance enactments are documented as material or 'real' artefacts.

The first enactment of the performance consists of me standing on the Great Wall of China wearing a sandwich board that states, I'm Garrett Lynch (IRL). The sandwich board is a Second Life 3D object previously employed in numerous 'virtual' performances exported and constructed as a scaled-up replica. The statement is a word play on both my Irish nationality and use of the internet acronym 'in real life' as an affirmation of identity and existence. The second enactment of the performance is identical to the first, however, on this occasion, it is my 'virtual' representation, that is my avatar, wearing the original sandwich board 3D object that stands on a 3D reproduction of the Great Wall of China in Second Life. Each performance is documented by imagery, the first by a photograph and the second by a computer screenshot. These images are then used as the reference material to arrange for the creation of two paintings via the internet. Two separate companies in different countries are commissioned to produce and in turn frame the paintings, which is all

negotiated through a series of website forms and emails. The paintings are created by an oil painting company in Fujian Provence, China while the diptych that frames the paintings is constructed by a framing company in London, England. The source photograph and screenshot along with various media including emails, order forms and postal receipts generated during the performance are photographed and framed as the ten performance artefacts. Throughout *The Distinction*, performance should be understood as extending beyond the initial enactments to include the processes of commissioning, negotiating, collecting and assembling through the internet. As such, the diptych and artefacts are simultaneously part of the performance as well as its documentation providing an observer–user with the narrative of the performance.

Figure 4.4.3: *The ten framed artefacts and diptych from The Distinction Between Here and There, Now and Then (Lynch, 2013 c), Borough Road Gallery, London.*

The Distinction extends a series of prior performances about the role of the artist, identity, being and the nature of what is 'virtual' and 'real'. These occurred initially in online 'virtual' worlds such as Second Life and subsequently in 'real' places related to the representation of identity and the body as depicted or explored in western art and philosophy. The exploration of 'virtual' and 'real' as specific types of space in *The*

Distinction is a direct result of research undertaken in the creation of these artworks. For example, my adoption of the convention of inverted commas around the terms 'virtual' and 'real' dates from this period and originates in the identification of this highly problematic terminology in new media that discuss and as a consequence demarcate these spaces. The use of 'virtual' and 'real' appears in numerous ways throughout all the performances but notably by each performance employing the acronym IRL as a reoccurring motif.

Figure 4.4.4: *The diptych from The Distinction Between Here and There, Now and Then (Lynch, 2013 c), Borough Road Gallery, London. The diptych consists of the left painting The 'Virtual' and the right painting The 'Real'.*

The diptych in *The Distinction* is composed of the second performance enactment painting as the left panel, titled The 'Virtual', and the first performance enactment painting as the right panel, titled The 'Real' (Fig. 4.4.4). As with prior performances, *The Distinction* emphasises 'virtual' and 'real' as problematic terminology through the use of inverted commas in all of its documentation. However, in this instance, the titles of the paintings directly incorporate the terms as it is the principal topic of the performance and the produced artworks as part of the documentation. The paintings are displayed left to right, the reverse order of the performance occurrence and the

paintings' creation, as a reference to prior performances initially occurring in 'virtual' space and then subsequently in 'real' space. However, their occurrence, creation and ordering also suggest a need to reconsider what is often an assumed order of hierarchy or relationship between 'real' and 'virtual'. This assumption entails that the 'real' is first and foremost and the 'virtual', embedded within the 'real' according to the framework, is required to simply be a simulation of it. *The Distinction* consequently demonstrates a complex but more importantly reciprocal relationship between 'real' and 'virtual'.

As well as an extension of prior performances *The Distinction* is also a culmination of their ideas. While prior performances folded ideas and processes from one space to another, the purpose of *The Distinction* is to achieve an outcome that simultaneously employs 'virtual' and 'real' spaces in equal proportion and allows the creation of a whole presented through the discussion of a specific place. That place is the site of the Great Wall of China as an architectural representation of China. The wall is a 'real' and specifically material border between China and the outside world, and yet it has a technological equivalent, the Great Firewall of China (Barme and Ye, 1997), which functions similarly as a networked or 'virtual' border. Performing on the wall in 'virtual' and 'real' spaces is a means of performing at both types of border, material and technological. Each border is a type of space that is 'virtual' and 'real' or immaterial and material between the nodes of two cultures either side of the wall.

Commissioning the creation of the paintings in China from Europe allowed me to in a sense step across the borders to perform. By juxtaposing China and Europe, east and west or inside and outside the wall, a correlative analogue for the 'virtual' and the 'real' is created grounding them in the everyday issue of difference. As such, *The Distinction* touches on ideas of within and without employed in the framework, however, it does so without employing diagrams. Employing diagrams does occur in *A network of people* by comparing the experience of being within a newly formed social network with the experience of seeing the network as a diagram from without or outside (see chapter 4.1). Understanding each space in each juxtaposed pair of *The Distinction* becomes a matter of positioning the phenomenological Self and its perspective of the Other, clarifying why the artist's identity or Self is employed as a form of protagonist who moves the observer–user through the complexities of these

spaces.

The status of the diptych as a 'real' and material artefact of documentation or evidence and the gallery as a legitimising literal space are employed to convince an observer–user that the performance occurred as it is presented. Consequently, an observer–user's cognitive event and the symbolic space it occurs within is influenced. Additionally, the juxtaposing of 'virtual' with 'real' space as the performance's subject is employed as a form of temporary distraction masking yet another ontological complexity. What is seen by an observer–user in the diptych of *The Distinction* should not be accepted as the reality of what was performed simply because the diptych has a documentary relationship to the performance. It is, in fact, a manipulation. On close inspection of the framed artefact that contains the source photograph to The 'Real' an observer–user will note that there is not one image but three in total. Two images that have been combined to create a third, the source photograph for the painting. As such, it is evident that the performance enactment of The 'Real' is a deception. It never occurred, its depicted space is a composite of photographs and the result of digital manipulation. The 'Real' is therefore as immaterial as its counterpart painting The 'Virtual', yet it is not 'virtual' it is possible. Both performance enactments and their paintings have therefore a basis in an immaterial yet distinctly different space, one 'virtual' and the other possible, and classifications employed in the artwork that are based solely on materiality or its lack thereof, break down.

Chapter 5: Networks as transformative to contemporary art practice

Introduction

This chapter's first three sections, chapters 5.1 to 5.3, will apply the framework of networked art to examples of artistic practice by other artists. The chapter, therefore, continues to address the question of what networked art consists of and how it operates as well as the question of how it can engage with technology and yet not be defined by technology (see chapter 1.1). However, the primary purpose of the three sections is to provide examples that respond to the question of how networked art practice is transformed as a result of addressing the above questions (see chapter 1.1). The principal research method employed in this chapter is field research involving visits to exhibitions and the research of exhibition catalogues and artist's publications relevant to the artworks selected as examples. Historical research, including literature searches, reviews of relevant academic publications, journal articles and conference proceedings are also employed where necessary to contextualise the artworks discussed.

Unlike my artworks discussed in chapter 4 that were created as part of this research and therefore in full awareness of the framework of networked art, the artworks selected for this chapter were created without knowledge of the framework and in many instances before the research commenced. Additionally, they have been selected without each artist's awareness. Their purpose has been to inform the development of the framework in chapter 4 and in this chapter, now that the framework has been explained, to provide a rationale for proposing networked art by demonstrating existing art practice that is networked. As such, the framework is applied retrospectively to the artworks as a means to understand them and what has been termed as a networked perspective of practice (see chapter 4). Artworks from my practice, some introduced in chapter 4 as well as two additional artworks, will also be discussed in relation to the practice of other artists in this chapter. This discussion is intended to position my practice as research within a broader context of concurrent emerging practice and allow an understanding of it to develop beyond the confines of specific technologies and disciplines.

The selection of artists and their artworks is based on two criteria. Firstly, that artists demonstrate an engagement with networks as a conceptual basis of specific

processes, themes or content essential to their practice and not exclusively as a specific technology. This demonstration will allow a case to be built that demonstrates a need for explaining practice as networked art. The second criterion for selection is that artists and their artworks support assertions in chapter 4. These include: networked art as continuing what I have termed as the grand-project of art in the modern era, that is questioning and reconfiguring the role of the artist, art as object, the means of its creation and the role of the observer (see chapter 3.1); networked art as enabling diverse combinations of subject, media, technology, platform, observer–users and so forth as nodes; and as a consequence of this diversity, that networked art is foremost conceptually-based and transdisciplinary.

A long list of artists was compiled based on these criteria. It included Jean-Pierre Aubé, Chris Chafe, Joe Hamilton, Caleb Larsen, Jan Robert Leegte, Mark Lombardi, Rafael Lozano-Hemmer, Nicolas Maigret, Filippo Minelli, Haim Steinbach, Penelope Umbrico, Chris Welsby and Andrew Norman Wilson to name a few. From this long list, a short list has been selected as strong examples of networked art. This selection contends that networks do not constitute a singular specific process, theme or content and as such could be argued as leading to a common form or aesthetic that associates the artworks and defines networked art. Instead, networks are a conceptual basis of a wide variety of specific processes, themes or content and lead to practices that would not typically be considered associated. However, to facilitate the structuring of the chapter commonalities identified across artists' practices have been employed to group them into three chapter sections. As such, these commonalities can be considered as broad emergent themes of networked art, which are already mentioned in discussions in chapter 4.

The emergent themes and the three chapter sections that address them are as follows: the representational and functional aspects of networked art and how they relate to cognitive and action events (see chapter 4.1) as part of visualising networks in chapter 5.1; behaviour understood as a network of events and its employment as a network as node (see chapters 4.1 and 4.2) within networked art in chapter 5.2; and the close relationship between behaviour and space (see chapters 4.3 and 4.4) in networked art that enables performative scenarios in chapter 5.3. Each of the three chapter sections will discuss how networks are transforming the way artists are

conceiving, creating or theorising their artworks, thereby identifying the artworks as networked art and distinguishing them from other forms of contemporary art. The transformations will be framed as part of what I have termed as the continuation of the grand-project of art in the modern era, its questioning and reconfiguring of the role of the artist, art as object, the means of its creation and the role of the observer–user.

The artists and types of transformation discussed within each of the first three sections should not be understood as separated out from each other nor should they be considered as only applicable to that section's discussion. In fact, as should be expected in the proposed networked art, the transformations are connected and influence each other significantly. They are not singular but rather a grouping of transformations that can be classified as a type of transformation and should not be considered an exhaustive list of types but instead the most significant transformations occurring in networked art. The ordering of the types of transformation in each section is not indicative of any form of priority or hierarchy. To some extent, each transformation is discussed in the same order the principles or their accumulated combination were discussed in chapter 4.

In this chapter's last section, chapter 5.4, a series of interviews conducted with key individuals involved in various aspects of the contemporary art world will be discussed. These will be non-practitioners of networked art including a curator, academic and theorist. While chapters 5.1 to 5.3 address the framework from an artist's perspective, how the framework is employed by an artist and applied to the practice of artists, chapter 5.4 will specifically address the framework from the perspective of those potentially involved in the discussion, theorisation and criticism of networked art. The section will evaluate and reflect on the effectiveness of the framework as a means to communicate networked art and subsequently how non-practitioners understand and position it within contemporary art.

5.1 Re-visualising a network: networked art as representational and functional

This section discusses the practice of two artists and two of my own artworks, *A network of people who attended an exhibition and contributed to the creation of this work* (see chapter 4.1) and a previously undiscussed artwork, from my practice as research. The context for the section is the discussions in previous chapters of networks having a visual basis. Specifically, this includes networks prior to the twentieth century as being *visually symbolic* of temporal relationships, a *visual abstraction* or a *visual representation* of spatial relationships (see chapter 2.1), and the development of networks in the twentieth century into a more functionally-orientated form (see chapters 2.2 and 2.3). The artworks discussed provide examples of how this occurs.

While chapter 2 demonstrates an overall progression of networks from predominantly a *representational* to a more *functionally-orientated* purpose over time, chapter 4 subsequently develops this discussion as part of the proposed networked art arguing a change in the relationship between the representational and functional purpose of networks. The framework of networked art is discussed as a network as diagram following Deleuze and Guattari's proposal that diagrams are a plan rather than an image that represents (Watson, 2009, p. 12). The network as diagram is applied in the creation of artworks that may be 'real' or 'virtual', that is that exist, and which are complexly networked in form. As such, chapter 4 argues that the representational and functional purpose of networks in contemporary contexts such as contemporary art practice no longer exists as an overall development of the former to the latter and must not, therefore, be considered as separated or opposing in any way.

It is this new relationship between the representational and functional purpose of networks that is considered as a re-visualisation in this section. Re-visualising is used throughout the section in two ways. It refers firstly to a *new visual or a new means of visualising* a network such as through new imaging technologies, which is often the case in networked art. However, it also refers to a *re-thinking of what it means to visualise* a network; that is that a network can be represented in a number of ways and not only through imagery. If for example a network that is visual or non-

visual is visualised as part of networked art practice, whether diagrammatically as a mesh of nodes and links or otherwise, enables behaviour and thereby is functional, what is the distinction between it and the network it represents? Can it legitimately be said that the visualised network is only representational of the original network or is it perhaps itself a new network?

In accordance with the framework of networked art the visualised network is a node of the original network, specifically a network as node. The visualised network can be determined as such because it assumes a new identity as a result of the original network, that of becoming a representation of it. As a node, the visualised network's identity is formed by its links to other nodes (see chapters 4.1 and 4.2), which in this instance are those of the original network. The visualised network enables behaviour within itself. However, by being a node of the original network, it also provides a means of behaving within the original network. The visualised network is, therefore, a network in its own right, however, since it is both a representational and a functional node of the original network it can never be as complex as the original.

Since networked art is an existing form, that is it exists as either 'real' or 'virtual', and it always allows cognitive or action-based behaviour it must, therefore, be surmised that networked art is always *simultaneously representational and functional*. The representational form a networked artwork can take ranges anywhere from the symbolic to the figurative and incorporates all types of media. Movement towards the symbolic is an increase in abstraction and movement towards the figurative is an increase in literalness. No networked artwork, however, can be fully abstract. Abstract refers to that which is non-existent and is, therefore, neither 'real' nor 'virtual' but instead equivalent to Lacan's imaginary and Deleuze and Guattari's possible. A networked artwork that is entirely abstract would not be a network because it would not represent anything, there would be no nodes, no behaviour and therefore it could not have any functionality. Equally a networked artwork cannot be entirely literal because it would be what is represented or an exact copy and therefore indistinguishable, making it no longer a representation. The framework as a network as diagram (Figs. 4.2.10, 4.2.11, 4.3.1, 4.3.5, 4.4.1, 4.4.2 and the model) is an example of movement towards the symbolic or an increase in abstraction and its position between the symbolic and figurative is indicated in Figure 5.1.1. The

framework as a network as diagram is representational of all networked artworks because it is sufficiently generalised or abstract and yet it is functional in that it provides a framework to conceive of networked artworks. The form of representation that a networked artwork employs, specifically more abstract or more literal, may influence the degree to which it is functional and the type of functionality, that is whether cognitive or action-based behaviour can be employed within it.

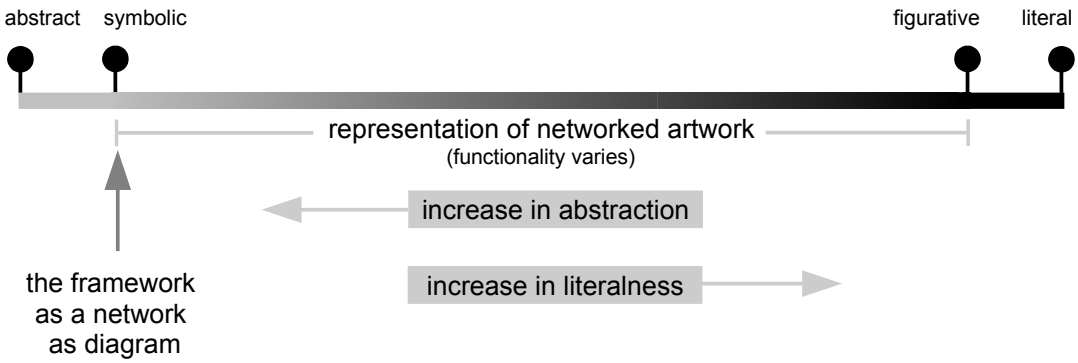

Figure 5.1.1: *The representational form of a networked artwork can range anywhere from the symbolic to the figurative. The framework as a network as diagram is indicated as movement towards the symbolic, an increase in abstraction.*

The coincidence of representational and functional purposes of networks is transformative to networks, which in turn is transformative to networked art as part of what is termed re-visualising within this section. It transforms what artworks are, shifting them from what might be considered as serving a representational purpose within a social dimension to serving a representational and functional purpose simultaneously. A representational purpose alone is nevertheless not non-functional. It is functional in that it serves as a means of communicating one-way to a cognitive node during a cognitive event (see chapter 4.3). However, a representational purpose of networks cannot incorporate an action event. The delineation of representational and functional purposes should not, therefore, be understood as opposing but instead as always *coinciding to lesser or greater degrees*. This section provides examples of practitioners' artworks that demonstrate the representational and functional purpose of networks, their complex codependence and the resulting implications of the points discussed above. Additionally, the section will explore how

practitioners in the process of re-visualising networks are developing new visuals and new means of visualising that extend beyond nodes, links and meshes, effectively the limitations of visual abstraction present in the network as diagram, to represent networks in new ways.

The art practice of Suzanne Treister[103] is the first example of an artist who re-visualises networks. With a background in painting Treister works across video, the internet, interactive technologies, photography, drawing and watercolour painting (Treister, n.d.). Her art employs "eccentric narratives and unconventional bodies of research to reveal structures that bind power, identity and knowledge" (*ibid*) within contemporary contexts. As a result of her frequent exploration of technological subject matter combined with the process of revealing structures, primarily the relationships within subject matter and the resulting networks they form, her practice has since the 1990s been closely allied with art that employs or explores technology. She has repeatedly been included in exhibitions and publications that link her art with cybernetics, networks and most recently post-internet art (Flanagan and Booth, 2002; Pickering, 2012; Larsen, 2014; Warde-Aldam, 2014).

Treister's practice re-visualises networks in generally two ways. Firstly, the artist frequently creates images that employ nodes, links and meshes to visualise networks in society as part of her artworks. As contemporary and pre-existing examples the networks selected by the artist are often not entirely visual, are non-visual or invisible. The imagery created are representations of the networks in diagrammatic form. As such, Treister's imagery return networks to a visual form, that is she re-visualises them in a manner reminiscent of examples discussed in chapter 2.1. Simultaneously, the imagery reinterprets the networks for the purpose of communication and understanding. The diagrammatic images are visually symbolic of temporal relationships and a visual abstraction of spatial relationships within the network represented. Secondly, through factual research, Treister makes connections between information that may otherwise be unknown or occluded to observer–users and invents fictional narratives that are subjective to her interpretation. In many cases, she combines facts with her narratives blurring the

103 Suzanne Treister (b. 1958), English artist.

boundary between reality and fiction. In this manner of re-visualising, it is unknown or subjective networks that are either revealed or created. The visualisation that occurs may incorporate diagrammatic forms, be suggestive of diagrammatic forms or not employ them at all. These two manners of re-visualising networks each demonstrate the representational and functional purpose of networks. They are for the artist, as part of the process of arranging the artwork, a representation of information to understand it and thereby become functional in allowing the planning of further behaviour. For the observer–user they are a representation of the artist's communicated narrative and become functional by serving as a means for their cognitive or action-based behaviour within the artwork.

HFT the Gardener (2014–15) by Treister employs the artist's two manners of re-visualising networks described above. It is a body of artworks consisting of drawings, paintings, photographs and digital prints supposedly created by a fictional character, as well as a documentary video about the character. All artworks are conceived to be shown together as an installation within an exhibition to create a narrative.[104] The installation tells the story of Hillel Fischer Traumberg who is an algorithmic high-frequency trader (HFT) within the London Stock Exchange. After an optically induced semi-hallucinogenic state, Traumberg experiments with psychoactive drugs to recreate and further the experience (Treister, 2015). He becomes fascinated with botany, experiments with the molecular formulae of drugs as trading algorithms, makes links between the numerological equivalents of plant's botanical names and the FT Global 500 index and visually documents all of his research (*ibid*). In the process Traumberg transitions from an insider of one network, that is as a trader within the stock market, to an outsider artist of the contemporary art world as a network.

HFT the Gardener incorporates drawings and paintings that employ diagrams with nodes and links to illustrate networks. Each illustrates different sets of relationships. These include: that of the central character to his concepts, research and environment (Fig. 5.1.2); the locations where drugs were taken; states of

104 The discussion of the installation *HFT the Gardener* in this section refers specifically to its exhibition at Annely Juda Fine Art gallery. All artworks created as part of *HFT the Gardener* were shown and configured to the space of the gallery.

consciousness; the components of an algorithm (Fig. 5.1.3); different companies within a sector; and different aspects of the universe including life and art. A variety of diagrammatic forms are co-opted in the creation of the drawings and paintings. These include the Judaic Kabbalah Tree of Life (Fig. 5.1.2), which as a branching pattern has already been established as related to the origins of networks (see chapter 2.1), radial diagrams and flowcharts similar to those used in software design (Fig. 5.1.3). As such Treister's, or Traumberg's, drawings and paintings demonstrate the artist's first manner of re-visualising networks, specifically visualising pre-existing networks in diagrammatic form.

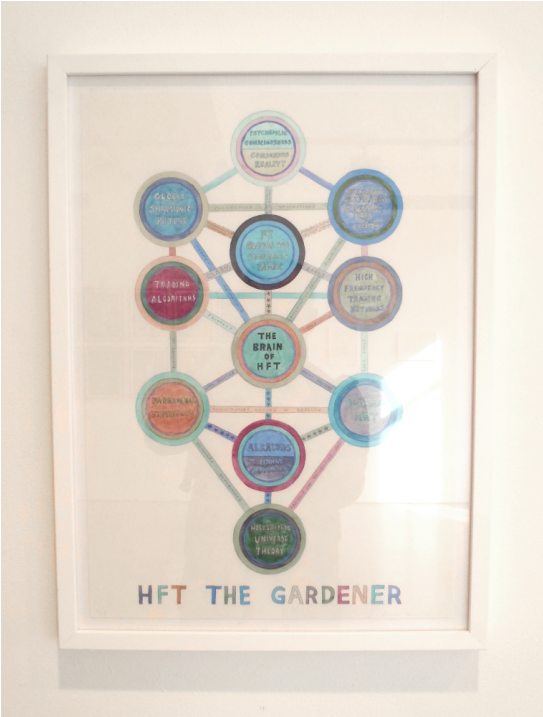

Figure 5.1.2: *HFT the Gardener. Key Diagram employing nodes and links in a form similar to the Judaic Kabbalah Tree of Life (Treister, 2014–15).*

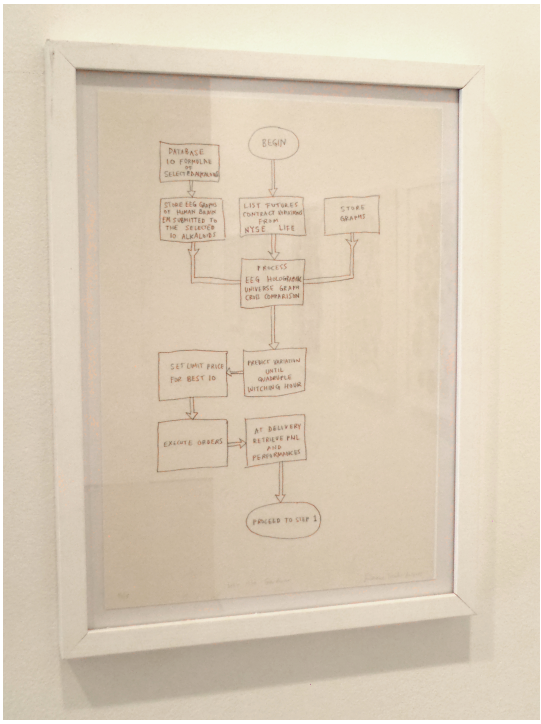

Figure 5.1.3: *HFT the Gardener. Trading Algorithm using Molecular Formulae of 10 Alkaloids to return feedback on Holographic Dimensions of Consciousness in the form of a flowchart (Treister, 2014–15).*

The artist's second manner of re-visualising networks, that of unknown or subjective networks, is demonstrated in *HFT the Gardener* in more complex ways. It occurs through visualisation that is suggestive of diagrams or employs non-diagrammatic forms. For example, within the body of works that comprise *HFT the Gardener* is a

series of ninety-two paintings (Fig. 5.1.4). Each illustrates a plant surrounded by documentation of the plant's name, chemistry, uses, preparation and effects on humans as well as the plant's numerological conversion and link to stocks in the FT Global 500 in tabulated format.

Figure 5.1.4: *HFT the Gardener. A view of the outsider artworks, ninety-two watercolour paintings in the installation (Treister, 2014–15).*

The plant illustrations of the ninety-two paintings are placed in a visual field of various plant elements including petals, leaves, seeds, pollen and so forth, which are arranged in a variety of branching, chain and mesh-like patterns. A cutaway view allows an observer–user to view both plant shape and its interior, revealing branching patterns in the form of roots, stems and stamen. The tabulated information is presented in cells defined by columns and rows that are reminiscent of a variety of methods of organising, storing and presenting information such as report forms, index cards, presentation slides, HTML tables and databases. Consequently, the paintings can be considered as visually suggestive of diagrams through the linking of

elements and visual patterns employed and are thereby representative of a whole network. By additionally employing non-diagrammatic forms such as information presented in columns and rows the paintings also remind an observer–user of methods used within networks.

The presentation of the ninety-two paintings is also, however, a means for the artist to non-diagrammatically re-visualise networks. The paintings all employ the same format, medium, visual style and subject matter suggesting that they are not just related artworks but in fact a carefully related series of studies. Collectively they relate the mass of research and experimentation conducted by Traumberg. As he gathered information about plants, trialled drugs and tested new trading algorithms he created a network of information that is presented as such within the exhibition space. The paintings have no particular order in the space. No numbering system is imposed. Assumptions of spatial ordering from left to right are also reduced by obliging the observer–user to approach the paintings from the right-hand side through a passageway leading into a larger gallery space. The paintings, therefore, attempt to mimic networks by employing some of their properties such as access at any point and non-linearity.

The non-diagrammatic re-visualisation of a network of information is also echoed across the entire installation as an exhibition. Once again no order is imposed to view the exhibition as one might expect when there is a narrative. Instead, the observer–user discovers the artworks out of the order in which they were created, and yet the narrative is clear. The documentary video, which has appeared in formats other than the exhibition as a form of summary of the installation,[105] is not created from Traumberg's perspective but presumably from Treisters. It provides context and an overview of the installation, yet is placed at the mid-point of the exhibition. In most instances, it is therefore unlikely to be discovered either first and considered as an introduction or last and considered as an endnote to the exhibition. If the exhibition as a whole is a network that can be accessed in any order and many of the artworks are in diagrammatic form, then it is suggested that the relationship of the exhibition to the documentary video can be considered similar as that of a map to

105 The documentary video notably appears in an issue of the online magazine POSTmatter titled New Mythologies (Benson, 2016).

its key. *HFT the Gardener* also re-visualises a network by employing new means of visualising a network. For example, computer software is employed in the creation of the documentary video. However, it is the artist's re-visualisation or re-thinking of what it means to visualise a network through a body of arranged artworks as an installation in a space and how they piece together its narrative that is most clearly demonstrated.

Ebon Fisher[106] is a transdisciplinary artist who can also be said to re-visualise networks. Over more than a thirty-year period, his practice has taken many forms including street art, performance and installation, however, at its core, it is conceptually based and manifested through visuals and language. It is the visual manifestation of concepts, a re-visualising of a form of hybridised social, biological and technological network, that is of relevance to this section. Heavily involved with the Immersionism movement[107] in Williamsburg, Brooklyn, New York, Fisher has since 1992 developed a series of visual codes as part of a transmedia system or world he calls the Nervepool. The codes, initially called Bionic Codes and more recently Zoacodes, grew out of the artist's information theatre company Nerve Circle, and the media rituals and gatherings they organised in Williamsburg. The theatre company had itself evolved from a biologically themed rock band in Boston as well as academic experience at the Massachusetts Institute of Technology Media Lab and the Center for Advanced Visual Studies. The codes map a transition from a metaphor of circuitry to one of neurons (Fisher, 2004 a), and incorporate an ongoing interest in nervous systems. They are named with reference to computer code, and while they are different in form to most computer code, which is textual, they are similar in purpose. Like computer code, Fisher's codes are designed to perform a function and operate as independent units. However, that function is “to trigger patterns of behaviour and processes of thought. In other words, the bionic codes act as moral operators on biological operands” (Boerboom, 1997) or what are termed in the context of this research as observer–users. As such, the environment Fisher's codes operate in is a social rather than a technological one.

106 Ebon Fisher (b. 1960), American artist.

107 *Immersionism* was a cultural movement in the early 1990s centred around the neighbourhood of Williamsburg in Brooklyn, New York. With some similarities to multi-media art it emphasised that audiences do not complete an artwork, artworks exist regardless of them, however, the audience is immersed within the artwork.

Visualisation of the codes and their dissemination forms what initially seems to be the body of practice produced by the artist. Unlike much of contemporary art, however, which is still to some extent embroiled in an art as object paradigm, Fisher's focus is not on the image as object but rather the image as a reproducible form across a wide variety of media and spaces. Consequently, what the observer–user behaves with and through is not a unique or limited visualisation confined to a gallery presentation. Instead, visualisations appear in prints, stickers, t-shirts (Fig. 5.1.5), animations, tattoos (Fig. 5.1.6) and visuals for nightclubs as well as gallery installations, which are distributed across a wide variety of social, public, broadcast (Fig. 5.1.7) and networked spaces. It is the codes visualisation and dissemination as an event, that is the media and social network or as the artist terms it the organism (Fisher, 2004 a; Appendix B) of codes and people created, and how it affects that is the actual aim of the artist's practice.

Figure 5.1.5: *Link with Distressed Humans, Bionic Code on a t-shirt, modelled by Hafsa Ibrahim, 1996 (Fisher, 2004 b).*

Figure 5.1.6: *Exalt in Random Connections, Zoacode tattoo on Environmental Anthropologist, Erich Schienke (Fisher, 2004 b).*

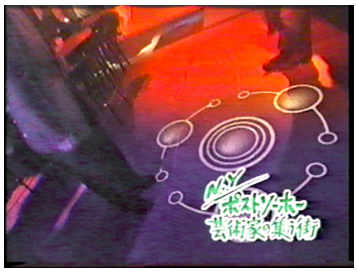

Figure 5.1.7: *Bypass Elitist Node, Bionic Code at Galapagos Art Space, Williamsburg, Brooklyn, and broadcast live by Fuji Television to Japan, 1997 (Fisher, 2004 b).*

Jennifer Dalton has stated that it is initially difficult to understand what Fisher creates (1998, p. 62), typifying the art as object paradigm and the mindset that it induces. The irony in Dalton's statement is that it is made in an article in the *Performing Arts Journal* and of all contemporary art forms performance, with its essence in an event rather than an object, does not historically have an art as object paradigm. Furthermore, performance is widely recognised as being an interdisciplinary practice employing multidisciplinary approaches and as such across the breadth of its

practice is not invested in any one particular form. It is not, however, what Fisher creates, that is imagery in its purest sense disassociated from both medium and support, or how it affects that is difficult to understand but instead perhaps the meaning that is encoded into the artist's visual codes.

Figure 5.1.8: *Comfort The Linkless Zoacode visualised on Nervepool.net (Fisher, 2007 a).*

Figure 5.1.9: *Link Enemies Zoacode visualised on Nervepool.net (Fisher, 2007 b).*

Fisher's practice is comparable with Treister's in several respects. Similar to Treister's methods in her first manner of re-visualising already existing networks, Fisher's visualisation of his codes employ nodes, links and meshes and are therefore diagrammatic. However, Fisher then combines this method alongside a strategy of invented narratives with a basis in factual research, which is similar to Treister's second manner of re-visualising networks. The codes, therefore, can be understood to have a basis in fact. They refer visually to a cross-section of existing artefacts such as circuitry, diagrams, neurons and nervous systems from fields such as cybernetics, media and living systems. However, with functions such as Comfort the Linkless (Fig. 5.1.8), Link Enemies (Fig. 5.1.9) and Equalize with Other Beings the codes also suggest subjective idealistic aspirations (Dalton, 1998, p. 62; Fineberg, 2000, p. 602) as narrative.

Boerboom suggests through an anecdote that the artist had an early basis for this

manner of combining the objective and subjective. He recounts how in the early 1980s Fisher asked nine psychologists, supposedly objective scientists, to draw a diagram of a brain cell and found that they each drew different subjective interpretations (Boerboom, 1997). Similarly, Fisher's visual codes have a subjective narrative. They are composed of the artist's own proposed concepts and the relationships between those concepts with only the type of form they employ, a diagrammatic 'drawing', being based in fact. Fisher, however, clarifies that rather than this implying that his codes are subjective based on individual interpretation or experience and are therefore fiction, they are instead the result of converging and colliding collective interpretations that he terms a “subjective ecology” (Appendix B). These “vital convergences” (*ibid*) of interpretation can in addition shift over time or wiggle away from us (Boerboom, 1997).

Consequently, there are no objective facts or truths because fact or truth is a form of “vital social-ecological organism” (Appendix B). Fisher's codes do not therefore re-visualise an existing network for the purposes of communication and understanding as is the case in part of Treister's practice. They are instead a re-visualisation of a network in that they transform non-visual, conceptual and collective interpretations or experience into a visual network, in a sense returning a functional network to a visual form while maintaining its functionality. As such, Fisher's codes are a re-thinking of what it means to visualise a network that is itself intended to foster ideals such as communication and understanding. While Treister blurs the boundary between reality and her invented fiction, Fisher blurs the already “fuzzy boundary between scientific fact and opinion” (*ibid*).

Since Fisher's practice involves the visualisation of codes, disassociated from both medium and support, and their dissemination across a wide variety of media and spaces it is both problematic and irrelevant to single out an individual artwork as if it were an artefact. All the artist's practice is a continuation of the same evolving concepts:

> “codes have grown to become an increasingly resilient network of meaning. New codes are birthed, compensating for and enhancing others, and ultimately contributing to the web of their interaction” (*ibid*).

Therefore, to clearly demonstrate Fisher's practice through example, a particular instance of dissemination is of more relevance. An installation at Test-Site, Brooklyn in 1992 (Fig. 5.1.10) provides just such an example. The installation employs the code Equalize with Other Beings. The code consists of three nodes, each with two incomplete potential links or lines pointing towards the other two nodes and collectively forming a triangular shape. The installation space is initially darkened. It lights up with a projection of the code on the floor when an observer–user triggers a motion sensor configured to detect movement within the location of the nodes. In doing so, it thereby places the observer–user within a node.

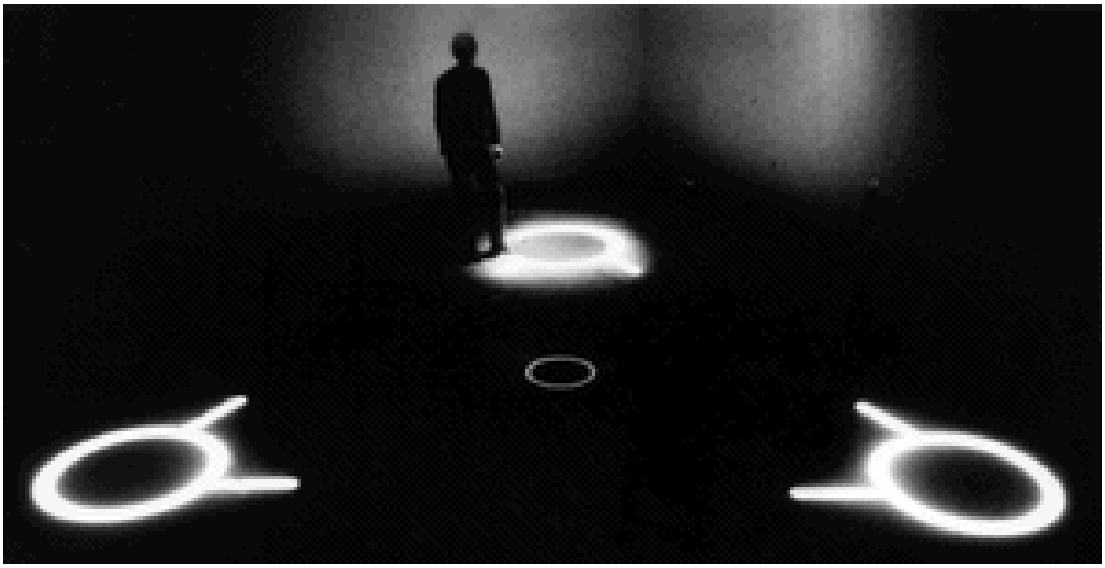

Figure 5.1.10: *Equalize with Other Beings Zoacode employed in the installation at Test-Site, Brooklyn (Fisher, 2004 b).*

The observer–user's behaviour within the installation is an action event, that is they enter the motion detected space and trigger the feedback of the projected code. However, once their action event is complete and the projected code is superimposed on both them and the space, the observer–user then cognitively positions themselves according to the projected node they occupy as well as other observer–users that may be occupying other nodes. This positioning is a cognitive event as the observer–user 'reads' the arranged artwork, deciphers its intended meaning and then decides on the next event, which may or may not be an action event. While the installation's interactive system and the action-based behaviour with it are crucial to enable the installation to function, its purpose can be understood

as primarily an instance of dissemination of the artist's codes. The installation, therefore, is a re-visualisation or re-thinking of what it means to visualise a network that is intended to foster ideals such as communication and understanding. Consequently, it is consistent with the rest of Fisher's practice. However, the installation also demonstrates re-visualising a network or employing new means of visualising a network through its use of new digital imaging and electronic technologies.

Similar to Fisher's practice, my artwork discussed in chapter 4.1, *A network of people who attended an exhibition and contributed to the creation of this work* (Fig. 4.1.4 and 4.1.5), also demonstrates both definitions of re-visualising a network. For example, the diagrammatic visualisation on the website is both a new visual and a new means of visualising a network. Each time the artwork is performed, the web application's programming and the integrated visualisation library that draws network diagrams on-the-fly visualises the unique network that is established. Therefore, each visualisation is new as is the data from observer–user's emails that are employed to produce it. The artwork as a whole, however, that is the combination of observer–users, business cards, email, website and diagrammatic visualisation, equally demonstrates a re-thinking of what it means to visualise a network. The diagram's use of nodes and links to visualise a network is similar to Treister's first manner of re-visualising a network and Fisher's practice of re-visualising a network. However, it is not a visualisation of any pre-existing network. Instead, as a result of how the business cards encourage observer–user behaviour, and the diagram is connected to that behaviour by email, the diagram foregrounds that it is one part of the network being established as well as a network in its own right that visualises the network of observer–users.

During the performance of *A network of people*, the website's diagram provides feedback about the performance as it occurs. Observer–users can navigate the visualised network within the website by zooming and panning as well as clicking and dragging to reorientate it. To afford an understanding of observer–user nodes and links, observer–users can also choose to view the visualised network relationally or hierarchically through the use of a toggle button. As well as being a visualisation of the network as it is established, the diagram is therefore also an interface to the

observer–user data. However, the purpose of the performance and the reason the diagram, website and business cards are initially created is to establish the network and its visualisation. As such, diagram and performance have a cyclical relationship, each is established to allow the other to be fully created or completed. The visualised network is therefore simultaneously a representation of what has happened and in a sense a plan of what is to happen, demonstrating a coincidence of the representational and functional purpose of networks.

In Fisher's practice his codes, which are intended to foster networks of communication and understanding, are also both representations and plans. However, while observer–users in *A network of people* can contribute to the network thereby changing the diagram, observer–users in Fisher's practice cannot change his codes. There is nevertheless a clear functional distinction between the network of observer–users and the network of observer–users visualised in the website diagram of *A network of people*. The former allows behaviour between observer–users, albeit in a restricted and mediated way through email, while the latter only allows behaviour with nodes as representations of observer–users. Neither behaviour has any impact on the other.

My artwork *This is Real Virtuality* (Lynch, 2013–14), a photographic and text-based networked performance that takes the form of a weblog and occurred on the web over the period of a year,[108] provides another example of re-visualising or re-thinking what it means to visualise a network. *This is Real Virtuality* is a first-person narrative that recounts the experiences of an unnamed individual noticing colliding virtu/re-alities, that is the merging of ‘virtual’ and ‘real’ spaces, in their daily life. Photographs were taken in 'real' or inhabited spaces, including public, commercial and urban spaces, of anything that made reference to 'virtual', online or digital contexts from the protagonist's perspective. Examples included: print media that employed the 'virtual' language of #hashtags; items such as a wind-up toy that made a video game character material (Fig. 5.1.11); graphic elements and iconography such as arrows or hazard warnings that looked similar to a computer cursor or a software loading bar; and the redesign of items such as gloves to work with touch screens. Texts were

108 The performance occurred from the 25/08/2013 – 25/08/2014.

then composed as if written by the protagonist to accompany the photographs as posts within the weblog.

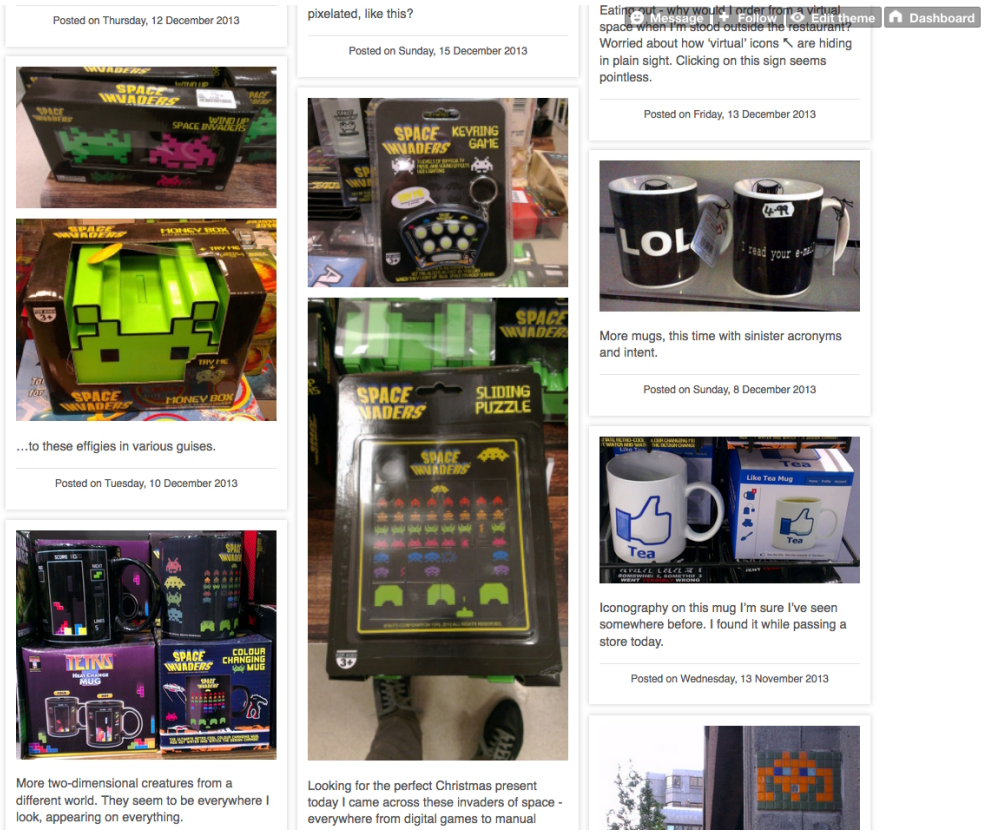

Figure 5.1.11: *This is Real Virtuality weblog. Photographs show video game characters made material in a number of ways as well as 'virtual' graphic elements and iconography.*

When combined, the photographs and texts provide examples of a variety of 'real' forms that have been transformed by 'virtual' contexts. The transformation of these forms can be explained through Robin Sloan's neologism the flip-flop. It describes a creative “process of pushing a work of art or craft from the physical world to the digital world” (2012), the 'real' to the 'virtual', until a transformed result is achieved. The forms are therefore evidence of Sloan's process of pushing, in this instance from the digital or 'virtual' to the physical or 'real'. What is photographed in *This is Real Virtuality* is in most instances, however, not art and each photograph is itself not considered an artwork. Instead, it is the photograph and text as documentation of the process of pushing and its subsequent push from 'real' back to 'virtual' that becomes a part of an artwork that is a performance in progress.

The transformation of 'real' forms by 'virtual' contexts in *This is Real Virtuality* is told through the protagonist's weblog posts. They express a fear of 'them', an unknown Other from a 'virtual' networked space, invading the 'real' space the protagonist lives in to transform it through the process of pushing. The 'virtual' space, viewed from a Cartesian dualistic perspective where the 'real' is understood as a material body and the 'virtual' the immaterial mind, can be seen to be an embodiment of the protagonist's fears. While the protagonist believes that the 'virtual' space of the web is transforming 'real' physical space, unknown to the protagonist, the 'virtual' space of his mind could also be transforming his perception of 'real' physical space and in effect his body. As a result, over the duration of the performance, the posts play out the protagonist's fears as a subjective, and what seems increasingly paranoid, narrative.

The performance and its archived existence on the web is, therefore, a consideration of 'virtual' and 'real' as mind and body, which are according to Cartesian dualism separate and in many ways opposite. Equally, the performance is a reflection on a particular point in technological history when 'real' and 'virtual' were understood in popular culture as binary opposites and not as this research understands them as overlapping contexts. The protagonist's antagonistic relationship with 'them' visualised and described within the weblog is a symbolic visual representation of that time. The forms photographed, however, also indicate the merging of what is understood as 'real' and 'virtual', that the invasion of 'them' from the 'virtual' is succeeding. As a consequence, the relationship between 'virtual' and 'real', mind and body can be understood with reference to Deleuzian folds, where the 'real' can be equated to the outside and the 'virtual' the inside. Outside and inside, 'real' and 'virtual', mind and body are essentially the same or reflections of each other, and this indicates in the artwork the suggestion of a transitioning to a time when these dichotomies no longer exist, which is being experienced firsthand by the protagonist.

The network that is re-visualised in *This is Real Virtuality* is a new network and space created as a result of the “process of pushing” (*ibid*) between 'real' and 'virtual' spaces and their merging or folding together. Evidence of this is in each digital photograph, which is folded back into the web and collected together with other

digital photographs as posts within the weblog. It forms a network that can, similar to the exhibited body of works in Treister's *HFT the Gardener*, be accessed by an observer–user out of the order in which the posts were created and yet cumulatively allows the creation of a narrative. *This is Real Virtuality* is representational of the network created between 'real' and 'virtual' spaces yet, unlike *A network of people* and both Treister's and Fisher's artworks, does so without recourse to diagrammatic forms such as nodes and links.

Treister's *HFT the Gardener* to an extent places the observer–user within the network through their navigation of the exhibition space. Fisher's artworks place his codes throughout social environments thereby immersing the observer–user within his network, encouraging them to behave and establish their proper network. *A network of people* encourages the observer–user to behave thereby creating a network around themselves. Each of these examples demonstrates a unique manner of placing an observer–user within a network. Nevertheless, their visualisation of a network, either wholly or in part, through diagrammatic forms simplifies or abstracts the network and as such, they can be argued as seen from without, outside or above (Mayer, 2013). As discussed in chapter 4.4 this typically contradicts immersion in a network. However, the visualisations of a network in each example are not the actual network but instead nodes within the network, specifically artwork elements that are networks as nodes.

This is Real Virtuality does not employ diagrammatic forms. Instead, it visualises qualities or effects of a network and can, therefore, be considered as a view from within. While the other artworks visualise mappings of networks yet ultimately do immerse the observer–user, *This is Real Virtuality* provides immersion within a network without any mapping of it. The immersion is, however, limited as the artwork as network is still a representation and what the observer–user behaves with is qualifiably different to what the protagonist behaved with initially. In all examples of a network visualised discussed above, diagrammatically or otherwise, there is a functional purpose regardless of whether it is a visualisation of an existing, fictional, subjective or newly created network. Each network allows the observer–user to behave with the artwork as a whole, with other observer–users or with the visualisation itself as an artwork element. Consequently, they all provide a

demonstration of a simultaneous coincidence of the representational and functional purpose of networks yet in distinct ways.

5.2 Behaviour as emergent property: the network as node

In chapters 4.3 and 4.4, the node behaviour in a networked artwork is described as neither cognitive nor non-cognitive, although it is the result of combinations of cognitive and/or non-cognitive nodes, and that it cannot be classified by employing material or immaterial categorisations as it is event-based. Explained as the *cognitive or action events that occur between nodes*, behaviour is distinct from other nodes and as such can be considered as an *emergent property of nodes* that are arranged. What however does it mean for behaviour to be an emergent property of nodes? What behaviour precisely can occur between nodes in a networked artwork? This section discusses the different types of behaviour in three artworks by two artist groups in response to these questions. Two of my own previously discussed artworks from my practice as research, *Sculptures for Distant Places*, *Sculpture for Mountains*, *Sculpture for Lakes* and *Sculpture for Forests* (see chapter 4.3) and *Transformations: Actions to Matter / Matter to Actions* (see chapter 4.2), will also be included in the discussion to clarify the types of behaviour they employ.

It has been established in chapter 4.1 that networked artworks contain a form of self-similarity or levels of networks (Vitale, 2014) and this is termed as a network as node. Artworks may either reside within other networks as a node or have other networks reside within them as a node. For example, all artworks reside within culture, which is a network of artworks, galleries and so forth. Within a networked artwork the nodes artist and observer–user are each reducible to organs, cells, atoms, character traits, skills and so forth and so equally each is a network as node. Additionally, artist and observer–user move from artwork to artwork in culture and therefore also exist in other contexts. Consequently, if a networked artwork and its nodes artist, artwork element and observer–user can each be a network as node, it is argued that behaviour cannot be an exception and must also be capable of being a network as node.

Being a network as node is in most instances a possibility and not a necessity of either the networked artwork or its nodes. For behaviour, however, it is a necessity. So while behaviour has this attribute in common with all other parts of a networked artwork, it is nonetheless distinct. Additionally, behaviour as a network as node

differs from all other types of network, such as a digital network or social network, that can occur in an artwork. For example, in a digital network, the various types of digital media or information that are networked or connected with each other continue to have an identity as media when the network no longer exists. Behaviour is formed of cognitive or action events that occur between nodes of the artwork. These events are the nodal links of a networked artwork but in effect are also the nodes within behaviour as a network as node. Behaviour can, therefore, be considered as the location of intersection of nodal events or simply as a network of events. As such, behaviour is a binding material of a networked artwork and its identity is formed by the networked artwork. Without behaviour nodes, in particular, those that have been arranged from outside of the context of art, would lose the identity they attained as part of the artwork and the artwork would not exist—or at the very least no longer be specifically a networked artwork. While all nodes within a networked artwork can be a network as node, behaviour's ability to enable other nodes to become part of a networked artwork consequently requires it to be considered as transformative to those nodes and the networked artwork as a whole. For these reasons, behaviour requires additional discussion in this chapter in relation to examples of practice.

Examples will help to clarify how behaviour is a network as node and what type of behaviour can occur in a networked artwork between the nodes of artist, artwork element and observer–user. The examples will demonstrate how behaviour occurs between these nodes, binds them together cohesively as an artwork and in turn how this qualifies behaviour as an emergent property of the networked artwork. The first two examples of networked artworks that demonstrate behaviour as a network are by the artist collective Greyworld. Founded by Andrew Shoben, Greyworld create artworks for public spaces that typically explore behaviour in two principal ways. These are user-based interactivity and interactive systems that do not require any user interaction. As such, their art demonstrates the types of behaviour defined within the framework of networked art, that is cognitive and action events originating from observer–users as cognitive nodes that are directed at artwork elements as non-cognitive nodes and action events between artwork elements as non-cognitive nodes.

Words (2009) by Greyworld is an interactive installation employing sound, light and locative technologies. It is principally an example of action events originating from observer–users and directed at artwork elements, however, it also employs action events between artwork elements. In *Words* observer–users are given a white cube containing an electronic device (Fig. 5.2.1). They are invited to behave with the cube by recording a word that they speak into it. When the cube contains a word, it lights up. Then, with a cube, each observer–user enters the area of the installation space (Fig. 5.2.2). Both cube and installation space are artwork element nodes. While in the space the cube's function is threefold. Firstly, it behaves autonomously with the space to provide a means of tracking where it and the observer–user are. Secondly, the cube contains the observer–user's word as a sound. The observer–user can behave with the cube by tipping it, 'dropping' the sound onto the floor of the installation space where it remains for several hours and turning the cube's light off. Lastly, the cube is, via a set of headphones, a means for the observer–user to behave with the installation space discovering and listening to other observer–users' words 'dropped' in the space (Greyworld, 2009).

Figure 5.2.1: *White cubes used by users in Words to store words (Nasonero, 2009 a).*

Figure 5.2.2: *Users explore the installation space of Words with their white cubes (Nasonero, 2009 b).*

In almost all instances of behaviour, *Words* employs action events. However, in the last instance of listening, the observer–user principally employs cognitive events to understand what has been said by other observer–users and they do not influence their sounds in any way. Over the course of the exhibited installation, its space is constantly transformed as a result of observer–user behaviour. The words contributed by observer–users and where they are 'dropped' create an ever-changing montage of different words and voices but also a network of behaviour within which

subsequent observer–users behave.

Figure 5.2.3: *The Source (Wikipedia, 2007).*

The Source (2004), also by Greyworld, is a sculptural system installed in the atrium of the London Stock Exchange that "generates forms and motion based on live data streams from the Internet" (Greyworld, 2015) about the stock market. The artwork consists of one hundred and sixty-two cables arranged in sets of two to form a square grid of nine by nine. Each cable holds nine spheres that contain a motor to move it along the cable and a light to illuminate it from inside (Fig. 5.2.3). *The Source* is in effect a visualisation of the behaviour of the stock exchange as a network relayed via the internet, another network. During trading hours the system visualises the "names and positions of currently traded stocks" (*ibid*). Outside of trading hours, the system's spheres lower to the ground floor and stack into the form of a cube. Spheres illuminate in the shape of an arrow pointing up or down depending on the stock exchange's overall closing status. *The Source* employs the stock exchange and the internet, two external networks, as artwork elements that are

networks as nodes. As a result of the behaviour that occurs between nodes in *The Source*, behaviour is established as an internal network as node. The movement that is produced as a result of the behaviour between nodes and networks is data transformed and it, in turn, transforms the space of the atrium.

In contrast to *Words*, which primarily demonstrates cognitive and action events originating from an observer–user as a cognitive node and directed at an artwork element as a non-cognitive node, *The Source* primarily demonstrates action events between artwork elements. That is, between the artwork's cables, spheres, data from the stock market and the internet, the latter two of which are also nodes of other networks. In the largest and not necessarily visual sense, both artworks visualise behaviour. *Words* achieves this through sound and light that is actuated by interaction and movement, and *The Source* achieves it through movement and light actuated by network data. While *Words* is reliant on an observer–user's words spoken in their language and the resulting sound created to populate the installation that is then navigated by an observer–user's movement, *The Source* is reliant on data in a text-based form. The data employed in *The Source* is the result of action-based behaviour within the networks of the stock market and the internet. It may be generated by an observer–user as a cognitive node or by a non-cognitive node such as a server. Behaviour in *The Source* does not therefore necessarily require an observer–user. Additionally, if an observer–user is responsible for generating the data that is used by the artwork their behaviour is indirect and they are not necessarily aware or in control of how it influences the artwork.

Behaviour in both artworks has additional levels of complexity. An observer–user's action events directed at a cube in *Words* is ultimately informing another observer–user's action events. As such, it is a mediated or indirect behaviour employing the cube as well as the space and time of the installation. An observer–user can engage in action events indirectly with another observer–user present in the space by 'dropping' their word so it can be heard or directly with another observer–user by navigating the space together. An observer–user can also hear another observer–user's words several hours after they have left. As a result, observer–users partake in combinations of action events that are synchronous and asynchronous but also direct and indirect between them, their cube and other observer–users. Similar to

Words, *The Source* also allows action events from an observer–user to artwork elements. These action events are also mediated or indirect behaviour directed at other observer–users, however, it is much more indirect as it is the artwork that decides what data from behaviour to act upon. Action events only inform another observer–user's observation, that is their cognitive events. In *The Source*, data should, therefore, be considered as a manifestation of action events in analogue form, specifically as the movement of the sculptural system. Data within the framework of networked art is always assumed as part of cognitive and action events. However, it is generally not referred to as the form it takes can be exceptionally diverse, tailored to individual examples of networked art and be arbitrary in its use. In *The Source* data is the manifestation of action events that have occurred without or outside the context of the artwork and are appropriated by it.

Since both *Words* and *The Source* employ direct or indirect action events by an observer–user it necessitates that cognitive events also occur (see chapter 4.3). In *The Source* action events are indirect, so cognitive events must also in a sense be indirect. Initially, an observer–user may have no knowledge of their indirect action events on the artwork, yet the observer–users who are arguably having the most influence on the artwork via the data it employs are the stock market traders employed in the stock exchange where *The Source* resides and see it daily. As such, awareness of their action events on the artwork rapidly increases even though their level of control of how they influence the artwork is kept to a minimum. In both *Words* and *The Source*, it is certain that the shape each artwork takes is dictated by behaviour as a whole. Without it *Words* would be experienced through a cube's headphones as a silent and dark space and *The Source* would not visualise anything, its spheres would merely be fixed in their stacked form of a cube.

Notably different in media, form and its use of behaviour is *Les Nouveaux chercheurs d'or* — The New gold diggers (2015) by Émilie Brout[109] and Maxime Marion,[110] the third example of behaviour as a network. The artwork consists of a series of seven gold coloured product samples ordered for free online. Each sample

109 Émilie Brout (b. 1984), French artist.

110 Maxime Marion (b. 1982), French artist.

is framed together with a printed description of the sample and its source (Fig. 5.2.4) in much the same way that an archaeologist or naturalist would archive artefacts or specimens (Brout and Marion, 2015). According to the artists, the artwork "addresses the complexity and opacity of international distribution networks" (*ibid*). What they acquire via a network "required a huge amount of technical and human resources, often passing by several different countries" *(ibid*).

Figure 5.2.4: *Les Nouveaux chercheurs d'or — The New Gold Diggers, Carroll / Fletcher Gallery, London (Brout and Marion, 2015).*

The artwork employs behaviour as a network in three interconnected ways. The foremost type of behaviour as a network is the behaviour of the artists as cognitive nodes. The artist's action events with the distribution networks of manufacturing companies, who are also cognitive nodes, positions them in a performative role. Obtaining samples through the internet is in effect a performance and has a duration of as long as it requires to obtain each sample. When framed, the samples become artwork elements or non-cognitive nodes of the performance. In the process, they are transformed from requests or action events to material items and from samples to what is implied are artefacts that have been mined in online or 'virtual' space. Seen by an observer–user as a cognitive node in an exhibition the samples are the culmination of the artist's action events and provide documentation of what has

occurred.

The behaviour of each distribution network is the second example of behaviour as a network in *Les Nouveaux chercheurs d'or*. Each product distributor can be considered as an artwork element whose behaviour is a response to the artists' behaviour. A distributor's behaviour is framed by commerce, their need to sell their product, as well as being regulated by their industry's standards and conventions. Their behaviour includes providing free samples of their product, if their sector is known to provide free samples, with the aim of demonstrating an equal or better product and service than competitors. The artists' behaviour, on the other hand, requires them to conform to certain expectations of the distributor. For example, the distributor invests confidence in the artists as a potential customer. They expect that the artists' request for a sample is a manifestation of genuine interest in their product and ultimately that providing a sample will translate into a future sale. The artists, therefore, transform their behaviour by assuming a false identity (Brout and Marion, 2015) and "posing as a company" (Carroll / Fletcher, 2016) to meet the distributor's expectations and secure a sample.

Behaviour that is subject to the technical structure and content of the internet is the third example of behaviour as a network employed in *Les Nouveaux chercheurs d'or*. Similar to the influence the product distribution network has on the artists' behaviour by obliging them to meet distributor's expectations, the manner of communicating on the internet also influences the artists' behaviour. For example, communication with the distributor is carried out through webpage forms that typically all require the same information and is often validated on the webpage[111] or by email ensuring that the sender's email address is valid. As such, the artists' behaviour is transformed by the network in aspects including the information that is provided, the length or detail of information provided and the means by which it is provided.

Les Nouveaux chercheurs d'or can consequently be summed up and understood as a combination of who, what and how concerning behaviour as a network. Who

111 Validated information may include details such as an email address that is correctly formed, a postal address that corresponds to a correct postcode or a telephone number that has the correct number of digits and country code.

behaves? It is the artists who behave performatively within the artwork. What is their behaviour directed at? Their behaviour is directed at product distributors with the aim of acquiring samples, effectively transforming requests made online into material samples that are positioned or arranged as artefacts of the artwork. How is the artists' behaviour formed? It is formed or more correctly transformed as a result of behaving with product distributors, meeting their expectations and shaped by the mediation of the internet.

Sculptures for Distant Places, *Sculpture for Mountains*, *Sculpture for Lakes* and *Sculpture for Forests* (Fig. 4.3.6, 4.3.7 and 4.3.8) also provide examples of behaviour as a network. Similar to Greyworld's *Words*, *Sculpture for Mountains* (Fig. 4.3.6) is an example of action events originating from observer–users and directed at artwork elements. The observer–user can shout at the mountains visible in the artwork thereby performing what can be considered as a primal form of action event. The sculpture is a visualisation of that behaviour, effectively the echo of their shout transformed audibly and visually. *Sculpture for Lakes* (Fig. 4.3.7) can be considered similar to Greyworld's *The Source* in the action events it employs between two artwork elements; specifically between data retrieved online and the sculpture that visualises it. In both *Sculpture for Lakes* and *The Source*, it is the behaviour between nodes of various types that continually transform the sculptures visually and sonically. As such, behaviour is an emergent property of nodes and itself a form of network as node.

As with *Les Nouveaux chercheurs d'or* the process of arrangement and its documentation are of key importance to *Transformations: Actions to Matter / Matter to Actions* (Fig. 4.2.12 and 4.2.13). The internet is a staging ground for initiating action events that transform requests to items in both artworks. However, while *Les Nouveaux chercheurs d'or* ultimately produces framed artefacts for gallery exhibition, in *Transformations* the internet also becomes the point of completion. Items are moved from online to offline, from the 'virtual' to the 'real' or more specifically from the immaterial to the material, whereby actions become matter and then moved back again. Consequently, *Les Nouveaux chercheurs d'or* can be considered as one transformation while *Transformations* is two. In both artworks, items become readymades through the process of transformation. In essence, they are arranged

as a result of and in relation to the artists' behaviour as artwork elements or expressly as artefacts of the performance and attain a new meaning because of their new context.

The weblogs of the items in *Transformations* perform the same role as the printed description of the sample and its source in *Les Nouveaux chercheurs d'or*. Reminiscent of the methodology of a scientist it is similarly factual and documentative. However, by documenting digitally, *Transformations* is more aligned with current practices of scientists. Similarly, it employs databases and makes all processes and data involved transparent. Additionally, the extensive documentation of *Transformations* becomes a record of my time spent performing, how long each action was and what occurred. It has some of the features of an employee's timesheet and therefore makes a comparison between performance and labour.

At the outset of this section behaviour is termed as a network as node; specifically that it is a network of cognitive or action events that occur between nodes of the networked artwork. The networked artworks discussed are provided as a means to first explain the types of behaviour that can occur in networked art as well as their different configurations and secondly, through that to begin to demonstrate why behaviour must be considered as a network as node. Initially, behaviour as a network as node may seem paradoxical as it requires behaviour to be both a part of the networked artwork as a node and also a whole in itself, a network. Self-similarity or levels of networks (Vitale, 2014), however, already exist within culture (see chapter 4.1), so this must also include potentially within every networked artwork. Since behaviour consists of events, typical limitations of scale and so forth that would apply to material nodes such as artwork elements do not apply. Visualising behaviour as a node emerging out of the nodes in the two-dimensional triangle of the framework diagram (Fig. 4.3.5. and Stage 6.00 of the model) is a convention to understand its relationship as an emergent property of other nodes. It adds a *new dimension to the framework*, literally transforming it from a two-dimensional triangle to a three-dimensional tetrahedron, and consequently allows the transformation of a networked artwork's nodes and the space that can subsequently be created between them.

5.3 Spaces of behaviour: the paranodal and the performative

The discussion of space in chapter 4.4 outlined four types of *generalised space* assigned to networked art. These are *culture* as a space that all artworks reside within and *internodal space*, that is the space created between nodes in a networked artwork as a result of their behaviour together, which is in turn divided into *symbolic* and *literal space*. The focus of chapter 4.4 was internodal space and how cognitive or action events produced by behaviour define internodal space as either symbolic or literal. Space's relationship with behaviour is reciprocative in that space allows behaviour to occur within it, but behaviour defines space's characteristics. The section ordering of chapter 4 consisted of a section on behaviour followed by a section on space. This ordering was employed to communicate a clear understanding of what occurs before elaborating on where it occurs and how each defines the other. Chapter 5 employs the same order as chapter 4. With examples of behaviour in practitioners' artworks detailed in chapter 5.2 complete, the purpose of this section is to discuss two practitioners' artworks that clarify through example what precisely constitutes internodal space in networked art. Two of my own artworks, *The Distinction Between Here and There, Now and Then* (see chapter 4.4) and a previously undiscussed artwork, from my practice as research will also be included in this discussion to clarify the types of space they employ.

David Bowen[112] creates installation art employing technologies such as electronics and robotics. Examples of this include Bowen's Fly series consisting to date of *Fly Drawing Device* (2007), *Swarm* (2008), *Fly Lights* (2009), *Fly Blimps* (2010), *Fly Tweet* (2012), *Fly Revolver* (2013) and *FlyAI* (2016). Amongst these artworks, *Fly Revolver* (Fig. 5.3.1) demonstrates most dramatically an internodal space as a result of the intersection of two very distinct spaces of different species. The artwork consists of a transparent acrylic sphere containing a colony of houseflies and a wall-mounted robotic device with a revolver. The sphere's colony of flies are motion tracked by a video camera connected to a computer running custom tracking software, which in turn is connected to the robotic device. A circular shooting target is positioned within the sphere as a background for video captured and used to

112 David Bowen (b. unknown), American artist.

determine the position of a single fly or a group of flies. When flies are detected, their position relative to the centre of the target is calculated and employed to control the robotic device aiming the revolver in the same relative direction. If movement is detected in the centre of the target, the robotic device pulls the revolver's trigger.

Figure 5.3.1: *Fly Revolver (Bowen, 2013).*

Bowen's artworks can be compared to Greyworld's artworks (see chapter 5.2) by their use of electronics, and *Fly Revolver* exemplifies this. However, there are two principal distinctions between the artworks. Greyworld's *The Source* and *Words* are both conceived to be situated in public spaces and consequently rely on different types of observer–user action events. Conversely, Bowen's *Fly Revolver* along with the majority of his artworks are created to be situated, either wholly or partially, within a gallery space, and while observer–users are always implicated through cognitive events, his artworks are rarely reliant on action events originating from an observer–user. Greyworld chiefly employ urban grey spaces in their artworks. These are spaces that lack explicit or official ownership, purpose or use, however, are already clearly defined by their inhabitants. The spaces have structures, uses and conventions, pre-existing conditions that are separate to the context of art. The

behaviour developed by Greyworld builds on or more typically exploits these conditions. Space in Bowen's *Fly Revolver* comes with the prerequisite of a context of art and has far fewer pre-existing conditions. It avails of what has been accused as the sterile (Childish and Thomson, 1999) or antiseptic (Milner, 2003) space that has become common in galleries since the late 1960s. Epitomised in the conceptualisation of the term white cube (O'Doherty, 1986), this type of gallery space attempts to free itself from or minimise the influences of culture to accommodate a variety of practices. *Fly Revolver* takes advantage of this type of gallery space as one within which structures and conventions can be created, transformed and are often, because of the nature of their context, expected to be broken. The gallery is an internodal space between the two nodes of flies and observer–users in the artwork. It is effectively a space employed as a meeting point for two species where the relationship they have with each other can be transformed through behaviour.

The sphere in *Fly Revolver* can be positioned in several ways in relation to the revolver, including directly in front of it to allow the flies to take aim and shoot at themselves. However, the sphere is positioned to one side of the revolver (Fig. 5.3.1) allowing it to point into the space of the gallery. As such, rather than the sphere and revolver creating a feedback loop of action events between each other, the flies are allowed to point and shoot the revolver at the observer–user thereby incorporating them into the artwork. The artwork, therefore, employs space in a number of ways. Just as the sphere is for the flies an enclosed system within the gallery, the gallery is an enclosed system for the observer–user within the world and culture. While the former defines a space the flies can occupy and allows their natural behaviour to occur within it, the latter defines a space for the artwork and gives a context for the observer–user to behave within. Each space of sphere and gallery is an environment for each species behaviour.

Bowen purposefully employs technology that enables the flies' behaviour to initiate action events thereby foregrounding action events that are directed at an observer–user. He does not, however, allow observer–users behaviour to reciprocate in the same manner. Employing technology in this way is an unusual twist to the conventional performative enabling nature of interactive technology wherein observer–users are typically extended through technology (McLuhan, 1995) and

empowered to behave. Whether the flies' action events are reasoned, deliberate or controlled is doubtful. However, this does not negate that they can be directed at an observer–user and achieve an outcome that would otherwise be impossible. The action events that originate from the flies through revolver to observer–user may initially seem to be the one-way behaviour described in chapter 4.3 as action without change or response in paradoxical scenarios. However, the observer–user can respond in a manner. The flies' sphere is inside the gallery, and as a result, it is influenced by whatever occupies the gallery thereby allowing observer–user behaviour with it. An observer–user can direct light and heat at the sphere, exclude them by casting a shadow or introduce a breeze through the sphere's ventilation grills. Since the sphere holds the flies captive and is transparent the observer–user can also be in immediate proximity to the flies. All of these action-events allow the observer–user to direct behaviour or perform at the colony of flies and thereby possibly cause a degree of influence on the aim and triggering of the revolver.

Instead of a comparison with Greyworld's artworks on the basis of technology, which through comparison then in effect becomes a medium, *Fly Revolver* should as a result of the juxtaposition of different spaces and behaviour, as well as the juxtaposition of nature and technology, be compared to Hans Haacke's *Condensation Cube* (Fig. 3.2.4) discussed in chapter 3.2. Haacke's *Condensation Cube* and Bowen's *Fly Revolver* are both conceived to reside within a gallery. In each artwork, the gallery functions as a framing mechanism for observer–user behaviour. Haacke's cube contains water, its evaporation and condensation as a natural force, while Bowen's sphere contains the flies as a natural force. Therefore, similar to the cube, the sphere is an enclosed system but not closed or isolated from the gallery that contains it. The gallery and observer–user operate as triggers and ongoing variables to the behaviour within both artworks. These continually transform behaviour, which in turn transforms the spaces and consequently the artworks, yet observer–users are not required to manipulate the artworks in any direct way.

The significant difference between Haacke's *Condensation Cube* and Bowen's *Fly Revolver* is that action events in the latter can be directed outwards from the flies in the enclosed system of the sphere at an observer–user. Atmospheric conditions of Haacke's cube have no action event directed at an observer–user, however, will no

doubt be a part of a cognitive event between observer–user and cube. This ability alone, however, does not distinguish *Fly Revolver* from the *Condensation Cube*. Equally, the artworks are not distinguished as a result of Haacke arranging his artwork with less of an understanding than Bowen of connectedness and systems as the basis of networks, a possible consequence of their separation of fifty years and the significant development of networks during that time. Haacke's first meeting with Jack Burnham, who introduced him to systems studies, took place at least one year prior to the first version of the *Condensation Cube* in 1963 (Haacke, 1971; Jones, 2016). Bowen's use of technological systems throughout his practice and for example the explicit use of the internet in *Fly Tweet*, one of the series of Fly artworks, clearly demonstrates his involvement in a network society (Castells, 2000). So both artists have knowingly arranged their artworks within or closely related to a context of networks.

It is what two-way communication allows in *Fly Revolver* that distinguishes it from *Condensation Cube*. It does not define *Fly Revolver* as a networked artwork and *Condensation Cube* as not a networked artwork but instead that the former is a more sophisticated networked artwork. *Fly Revolver* takes more advantage of the behavioural possibilities of a network and employs them in a more sophisticated manner. It transforms the behaviour of both observer–user and flies by placing them on an arguably equal footing. The observer–user may have a clear intent to direct behaviour at the flies, however, they can only hope to influence the flies through limited, indirect and imprecise action events. Conversely, the flies more direct and precise action events have an effect that most likely has little or no intent behind it. As a consequence of Bowen's implementation of technology, observer–users are diminished in the use of technologies that were created to enable them to control the world around them, including nature, and are instead on the receiving and potentially fatal end of those technologies.

If Bowen's practice utilises the enclosed space of the gallery as a white cube, then the practice of Jérôme Joy[113] utilises spaces that are very much the antithesis of this. Joy's practice predominately employs sonic media and takes the form of

113 Jérôme Joy (b. 1961), French composer/artist.

performance, installation and internet art. It is at the intersection of these that the artist has since 2004 developed many artworks, both individually and through collaboration, that he terms as occurring within networked sonic spaces (Joy, 2012). These spaces have combined and juxtaposed in various manners web-based spaces, 'virtual' worlds, maps of spaces, connected 'real' spaces, architectural, public, social and remote spaces.

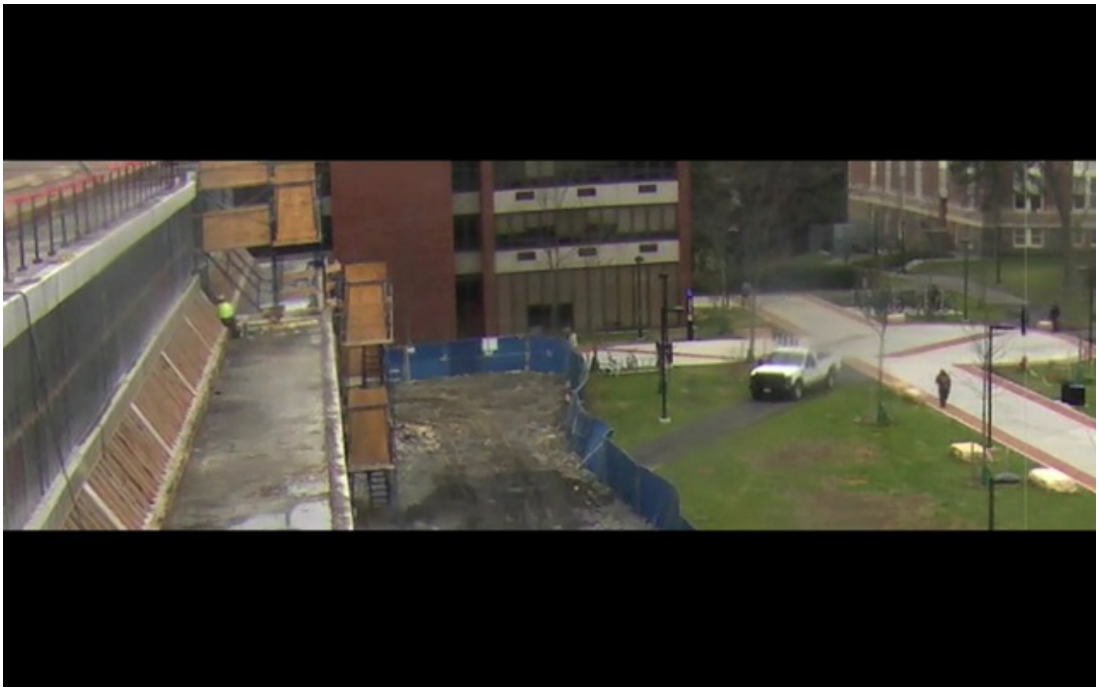

Figure 5.3.2: *Synema (Joy, 2013).*

Synema (2013) (Fig. 5.3.2) is such an artwork that explores 'real' remote spaces connected and combined within a web-based space to produce an audio-visual composition that can be viewed online through a web browser. It was premiered at the conference *Remote Encounters: connecting bodies, collapsing spaces and temporal ubiquity in networked performance* (2013)[114] which I organised at the University of South Wales. In that context it was presented as a live cinema performance, that is performed by the artist and projected in cinematic format within a theatre. Named after the combination of sync and cinema, *Synema* consists of

114 The conference occurred on the 11th and 12th of April 2013. The website of the conference can be viewed at http://remote-encounters.tumblr.com/. Additionally, papers from the conference are published as a special issue of the journal of performance studies, Liminalities http://liminalities.net/10-1/index.html.

server-side scripts that access live video and audio streams from webcams and networked microphones at remote locations. The retrieved streams are then passed to client-side scripts that combine and compose them in several ways. The result is an on-the-fly montage created from synchronised and a-synchronised streams (Joy, 2013, p. 5) that are different each time they are viewed as well as in each instance or version that is viewed. Almost indistinguishable from a typical film on the web *Synema* is presented without the customary control bar and as live media cannot be paused, rewound or fast-forwarded.

The cameras and microphones employed in *Synema* are each located at different remote locations from the observer–user and as such provide a means to listen beyond the boundary of the observer–user's sense of hearing. The artist terms this extended listening, which creates an expanded space within which the observer–user experiences the artwork (*ibid*, p. 2). The expanded space is facilitated by the ability of networked technologies to combine different media in different formats and not just from the different locations where they are captured but also from the different servers that subsequently host the media. Imagery and sound from the remote 'real' locations are folded together *(ibid*, p. 5) within the networked or 'virtual' web space of the artwork. The expanded space in *Synema* is the internodal space between multiple nodes of the artwork, effectively a space as a meeting point of locations, their imagery and sound. However, the expanded space is not simply the web space. It also incorporates the 'real' space of the observer–user viewing *Synema*. As such the received imagery and sound, while “preserving their own local properties and 'colourations'” (*ibid*), are mixed with the imagery and sound of the observer–user's material environment creating a space that is transformed as a result of the combination of remote and local.

The expanded space created in Joy's practice forms part of what he terms as “expanded and expanding auditoriums” (*ibid*, p. 2), that is a space specifically created to listen within.[115] Auditoriums are typically material, architectural constructions, within which musicians or artists and observer–users behave in

115 The reader should note that Joy's use of the term expanded as well as the direct reference to cinema in the naming of *Synema* (sync and cinema) are a reference to the concept of expanded cinema. They refer in particular, to Gene Youngblood's publication *Expanded Cinema* (1970) as the key text to cinema being more than merely a linear or narrative form.

immediate proximity. However, in Joy's concept of the expanded auditorium, the limitations of material, architectural constructions are overcome or completely removed thereby transforming the concept of an auditorium. For example in *Synema*, as a result of its use of the internet to facilitate the formation of its space 'virtual' or immaterial space is merged with 'real' or material space. Therefore, in the artist's concept of the expanded auditorium what is created:

> "is both an architectural 'structure' where we listen to the space (determined by our action of listening to spaces and the environment) and the virtual and ductile listened space through sound production (music, voice, ambient sound) proposed in this location (determined by the properties of space that color and tint the sounds that propagate in space)" (*ibid*, p. 4).

Joy specifies that as an example of an expanded auditorium *Synema* can be considered a subset type that he terms an internet auditorium (*ibid*). As an example of an internet auditorium, what *Synema*, in particular, can overcome in the limitations of a material architectural auditorium is the necessity of artist and observer–user proximity. The artwork benefits from the performative enabling nature of digital and networked technologies that extend (McLuhan, 1995) both artist and observer–user behaviour allowing all combinations of behaving remotely or locally. As evidence of this, Joy performed *Synema* at the conference from a remote location in France to local observer–users within the theatre in Cardiff as well as remote observer–users on the web thereby expanding both artist and observer–user's space of behaviour.

Joy's conception of expanded spaces, however, extends far beyond internet auditoriums and their potential for creating transformed spaces on a planetary scale that are behaved within from multiple locations. Inspired by a series of proposals since the mid-1990s to place a microphone on Mars,[116] he has also conceived of an Earth/Mars auditorium that is "extended to an interplanetary dimension" (Joy, 2013, p. 12) and is therefore significantly larger. If successful, Joy's Earth/Mars auditorium will be the first instance of a networked artwork that extends beyond our planet and

116 Proposals by Berkeley Space Sciences Laboratory, the National Higher French Institute of Aeronautics and Space and the Planetary Society.

thereby validates discussion of such a possible scenario in chapter 4.2. Additionally, it will require new technologies to overcome planetary limitations, effectively to be "the next Internet and its future, i.e. next developments into electronic communication (telepresence and co-presence) at very large and incommensurable distance" (*ibid*).

My artwork *The Distinction Between Here and There, Now and Then* (Fig. 4.4.3 and 4.4.4) has some similarities with *Fly Revolver* and *Synema*. Notably, the juxtaposition of different types of space to produce and transform behaviour. *The Distinction* and *Synema* do this to provide a performative opportunity for the artist while *Fly Revolver* does it to allow flies and observer–user the opportunity to behave. *Fly Revolver* and *Synema* both employ 'real' spaces including, material space such as the sphere space of the flies and the gallery of observer–users in *Fly Revolver*, and the performance space of the artist and theatre of observer–users in *Synema*. As well as this they employ immaterial 'virtual' space such as the internet in *Synema*. In *The Distinction*, the painting The 'Virtual' also employs an immaterial space, specifically the 'virtual' world of Second Life. However, the painting The 'Real' fabricates a different type of immaterial space by digitally compositing and manipulating photographs. The space of the painting The 'Real' is therefore not 'virtual' but possible and as such part of the intention of *The Distinction* is to explore beyond ideas of 'real' and 'virtual' space within artistic practice.

The final artwork to be discussed within this section is straightforward in how it addresses the subject of spaces of behaviour, and as such, the framework of networked art, but more complicated in how it may be understood as an artwork let alone one I created. *Remote Encounters: connecting bodies, collapsing spaces and temporal ubiquity in networked performance* (Lynch, 2013 a), mentioned above in relation to *Synema*, was a two-day international conference with performance evening at the University of South Wales. Its purpose was to assemble subject specialist practitioners, academics and researchers and provide them with a space within which to meet, share and discuss with each other. The aim was an exploration of the use of networks as a means to enhance or create a wide variety of performance under the umbrella term networked performance. What could be considered as separate artistic practices and performance types defined by conventional boundaries such as media, purpose and methodology were presented

and discussed at the event. These included: web-based performance (Fig. 5.3.3), 'virtual' world performance (Fig. 5.3.4), telematic performance (Fig. 5.3.5 and 5.3.6), video art, sonic performance, dance (Fig. 5.3.7) and wearable technologies (Fig. 5.3.8). Practice throughout addressed numerous topics including how networks can be a site for performance that provides opportunities for practitioners such as collaboration, merging geographically separate places and times, reconfiguring or transforming space and the relationship between artist and observer–user.

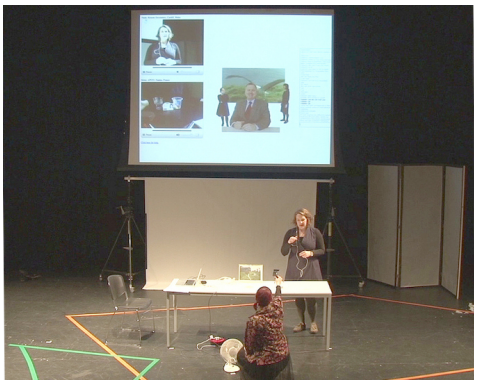

Figure 5.3.3: *make-shift web-based performance by Paula Crutchlow and Helen Varley Jamieson (Lynch, 2013 b).*

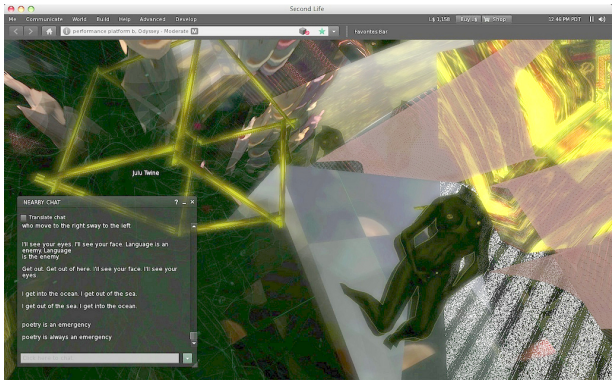

Figure 5.3.4: *Pain Dance performance in the 'virtual' world Second Life by Alan Sondheim and Sandy Baldwin (Lynch, 2013 b).*

Figure 5.3.5: *Presents // Presence streaming video performance by Lembrança, Rea Dennis & Magda Miranda (Lynch, 2013 b).*

Figure 5.3.6: *OnLove web-based performance by Annie Abrahams (Lynch, 2013 b).*

Figure 5.3.7: *It's Not You, It's Us, performance with video projection by Cassandra Tytler (Lynch, 2013 b).*

Figure 5.3.8: *Human Stitches talk on networked wearables by Prof. Dr Stahl Stenslie (Lynch, 2013 b).*

My role in relation to the event as a conference and performance evening was a combination of organiser, chair and curator. However, from the early planning stages, the event was also intended to be part of my artistic practice. The organisation of the event would be a form of performance, and my role would in that context be as an artist integrated with the other roles required for the event. Rather than consider each role and its perspective of the event as separate or requiring differentiation they were considered as the same. Inspiration was taken from the practice of relational aesthetics artists (see chapter 3.4), such as Rirkrit Tiravanija's organisation of dinners, who employ a breadth of social situations. If these artists can consider the arrangement of social situations as an art practice, which both they through their practice and Bourriaud through his curation and writing propose, then it also suggests that social situations can be employed by any subsequent contemporary artist. The social situation of a conference and performance evening, an event that has a schedule, duration and incorporates performance, is therefore proposed in *Remote Encounters* not alone as an artwork but one that is also performative and employs a strategy of appropriation.

Bourriaud's discussion of an art practice as "the invention of *situations* or *objects* which involve human behaviour" (2002, p. 36, my italics) allowed me to understand that in addition to arrangement being an act of creation or identification (see chapter 4.2), it also allows the networked artist two broad types of outcome. These are situations or objects, the latter of which are artefacts that could be 'real' or 'virtual'. My practice had for several years focused on the 'virtual' and as such, dematerialized

(Lippard, 1997) objects. More recently, it explored the process of dematerialization (*ibid*) itself as a means of transformation from the 'real', specifically material or objecthood (Fried, 1998), to the 'virtual', specifically immaterial or dematerialized (Lippard, 1997). Now my practice frequently employed both material and immaterial, and consequently demonstrated Bourriaud's invention of objects, however, it had not considered until this point how it could be purely the invention of situations (2002, p. 36).

Transformations (Fig. 4.2.12 and 4.2.13) and *The Distinction* (Fig. 4.4.3 and 4.4.4), for example, both address some tensions between performance and its materialised documentation as objects and the former specifically addresses the process of dematerialization (Lippard, 1997). However, they each employ materiality as the means to do so and, as with the majority of my practice, they conclude with material or immaterial objects that serve as documentation. *Remote Encounters* allowed a different paradigm to the predominantly material/immaterial paradigm of my previous artworks. Similar to *The Distinction* it proposed a different type of immateriality, not dematerialization to what is termed possible in Deleuze and Guattari's Ontological Quadrivium (see chapter 1.5) but instead *dematerialization to a situation*. As such, *Remote Encounters* enabled within the context of networked art not just a transformation of art from object to situation but also a transformation of my understanding of my practice and the form of outcome it could allow. Furthermore, *Remote Encounters* provided a demonstration of what is in the terminology of Deleuze and Guattari's Ontological Quadrivium termed as the actual and within the context of the framework of networked art considered as a part of the 'real' (Fig. 1.1.2). The event itself was a networked performance as artwork and while it required the production of objects including printed media, a website and various texts to promote and coordinate it before and during the event, none of these objects were produced with the intention of being lasting objects beyond the event's occurrence.

My identity as an artist was known to attendees at *Remote Encounters*. However, my role as such in relation to the event and its positioning as an artwork was neither explicitly revealed nor hidden. None of my artworks were performed or presented at the event, which served several purposes for the event and how it would impact its

attendees. These included allowing me to maintain impartiality when forming the event selection panel, subsequently when the panel collectively agreed on a selection of proposals for the event and finally by presenting myself unambiguously to attendees in the role of event organiser/chair/curator. However, excluding my artworks from the event also allowed me as an artist to focus solely on arranging through the process of identification without the distraction of the process of creation (see chapter 4.2), the personal investment creation entails and of course material or immaterial object outcomes it might produce. As such, my role of artist as a *context enabler* is evident within the intended context of *Remote Encounters* as a networked performance.

Risk was significant as the occurrence of the event relied on the attendance and cooperation of others. As I later wrote about the event, it was “an experiment in networking” (Lynch, 2014 b), not just in its subject matter but also in its structure. Fortunately, the event was well attended by a mixture of national and international delegates with differing backgrounds, research and practice representing a wide variety of networked performance. Additionally, artists performed at the event in Wales with both artists and observer–users in England, France, Belgium, Italy, Singapore, Brazil and the United States. All of these nodes together created a temporary “behavioural environment” (*ibid*), an internodal space that facilitated performance as both its subject and content, which enabled action and cognitive events between all its delegates. This created space assured that the experiment in networking was a success for its delegates as artists, academics and researchers as well as for myself as a part of my art practice.

In each example of networked art in this section, I have explained how the artwork creates an internodal space of behaviour, that is the space between nodes in the network that are defined by their behaviour together. The spaces are all distinct and range from an observer–user occupied gallery to a sphere occupied by a fly colony, from 'virtual' to 'real' and remote to local. The nodal behaviour that occurs within each of these spaces is described as performative. However, as a result of nodes behaviour continually rearranging the networked artwork the term internodal space, while correct as and when the networked artwork is formed, is proposed as not being sufficiently descriptive once the artwork develops beyond its initial state. The prefix

of inter- suggests a space that is between nodes and that possibly occurs as a side effect of their presence, but the space created is in effect purpose-built since it is defined by the nodes. The space is unique and will become increasingly so as the networked artwork develops. Therefore, what is initially an internodal space when the artwork is arranged becomes a *paranodal space*. While internodal space enables behaviour to occur within it and behaviour defines internodal space's characteristics, *paranodal space moves beyond or past the enabling of behaviour to redefine behaviour* and therefore can be considered as ultimately transformative to behaviour.

5.4 Transforming transdisciplinarity

The purpose of this research is to enable me to understand the “conceptual conditions” (Burnham, 1973, p. 3) of my artistic practice and the broader context of concurrent emerging artistic practice it resides within. The focus of the research so far has been to address this. Chapter 4 addresses it directly by developing a framework that explains the conceptual basis of the emerging practice, which I have termed networked art. The understanding formed from the development of the framework is intended to be from a practitioner's perspective or what can be considered as an understanding of networked art from within. It is, therefore, an understanding for artists directly involved in the arrangement of networked artworks. Throughout the research, I have applied this understanding in the creation of several artworks as practice as research. These have been discussed alongside the framework and in this chapter in relation to the practice of other artists. Additionally, the artworks were exhibited to the public in June 2017 at the Borough Road Gallery in London (Appendix A). Knowledge gained from the research as a whole has been employed in several articles and papers (Lynch, 2016 a; *ibid*, 2016 b; *ibid*, 2017 a; *ibid*, forthcoming) that discuss aspects of the practice and will continue to be applied to ongoing practice beyond the time frame of the research.

This section concludes the research by summarising and synthesising outcomes that address the purpose of the research. However, before doing so the framework's effectiveness at communicating networked art needs to be evaluated. I will evaluate whether networked art is framed and communicated cohesively as a practice within contemporary art to non-practitioners, specifically for curators, theorists, academics, journalists and critics, involved in its discussion, theorisation and criticism. If successful it should enable a level of understanding that can be passed on to observer–users through articles, curated exhibitions, education and so forth and will no doubt influence their behaviour in relation to networked art. This understanding will ultimately impact artists and their practice thereby informing networked art to some degree.

Three experts were contacted and interviewed about the framework of networked art (Appendices C, D and E). These were: Gaia Tedone, an Italian curator and doctoral

researcher; Josephine Bosma, a Dutch art critic, theorist and former journalist specialised in art in the context of the internet; and Francis Halsall, an Irish lecturer and art theorist specialised in the history, theory and practice of modern and contemporary art with a particular focus on philosophical aesthetics and the cultural reception of systems theories.

The criteria for selecting the experts included firstly addressing as broad a range of non-practitioners as possible, that is of the curators, theorists, academics, journalists and critics of networked art. Collectively the expert's experience was intended to yield an overview of networked art. All five types of non-practitioner were addressed in the combination of the three selected experts. Secondly, experts were selected based on their individual experience of networked art, whether it was with current definitions or historical precedents, critical or supportive, second-hand or hands-on; in effect how their experience offered a unique viewpoint of networked art. For example, Gaia Tedone's curatorial practice, which is similar to post-internet art by incorporating networks amongst other elements of contemporary culture and frequently involves her collaboration with artists as a curator-artist (see chapter 3.4), was the key factor in her selection. Her involvement with the #exstrange internet commissions manifested as eBay auctions were one example of this. Josephine Bosma's long-established theoretical discourse on new media art, net art and her highly critical writings on post-internet art provided both an established view of practice contemporary to networked art and how they were evolving. Francis Halsall's historical understanding of the relationship between systems studies and contemporary art provided a longer overview of the precedents of networked art as well as how and why networked art emerged in relation to these.

The selection of experts was to an extent additionally informed by distinct cultural backgrounds. Networked art as a transdisciplinary practice is likely to be somewhat of a transcultural practice. Artists and researchers employing a variety of different disciplinary skills, knowledge and approaches may in part be a consequence of the variety of their cultural, social and ethnic backgrounds. Therefore, cultural background as a criterion in selecting the experts was intended to reflect and support the potential transcultural nature of networked art. Cultural diversity had already been in evidence in delegates and artists who had contributed to the conference with

performance evening *Remote Encounters* and subsequently the artists that were selected and discussed in the first three sections of this chapter.

Each expert was provided with an explanation of networked art and the framework. These were principally provided through a combination of the interactive animated model of the framework[117] and a verbal explanation before the interview. Chapter 4 of the research was also offered to interviewees. Only Tedone availed of the chapter. All interviews were conducted as video calls lasting no more than one hour. Interviews were semi-structured with five open-ended questions about the framework. The questions focused expressly on evaluating whether the framework communicated networked art and thereby enabled an understanding of it. Each question promoted discussion about the framework and allowed interviewees to map their own experience and knowledge to it. A sixth and final question encouraged interviewees to probe into aspects of the framework that I may not have considered or specifically asked. Over the course of the interviews, the questions were adjusted or evolved to reflect aspects that arose in discussion and to focus on them. As such, the questions are not primarily intended to produce comparative data across interviews but to progressively identify and mine information used to reflect on and feedback into the framework.

Interviewees were first asked if they understood the framework as it had been explained through the interactive animated model of the framework, verbal explanation and text. Tedone stated that the diagram alone was not enough and that to this end diagram and text complemented each other (Appendix C). The purpose of the framework was an issue raised by both Bosma and Halsall in different ways. Bosma initially did not understand its purpose and how it benefited those it was targeted at (Appendix D). It was explained that the framework was principally for artist's, in particular for myself as a means to understand and further develop practice (*ibid*). Bosma then enquired “How would that framework be useful for a critic or curator?” (*ibid*). It was explained that the framework would assist in framing or contextualising practice so that it could be communicated in a variety of forms and contexts. Curatorial statements were given as one such example. As the interview

117 The interactive animated model is available at this URL: http://www.asquare.org/framework/

progressed with Bosma the purpose of the framework seemed to become clear, and the issue was not raised again.

Halsall was unsure whether the framework's purpose was to refer to “a specific type of art and if so what that art was or whether you were referring to art in general” (Appendix E). An example of my practice clarified the type of art the framework referred to and how it incorporated the components of the framework. The issue of “specificity” (*ibid*) was repeatedly returned to throughout Halsall's interview and identified that the framework potentially “covers all art” (*ibid*). This is unsurprising given that the framework is a network that offers a unifying or holistic theory of artistic practice. As Capra has stated “wherever we see life, we see networks” (2002, p. 9) when employing definitions that offer a unifying or holistic theory (see chapter 2.2). Specificity or its absence in the framework was discussed as both a weakness and a strength. On the one hand, the framework may be too generalised to be usefully applied by artists or precisely communicate what networked art is for non-practitioners. However, on the other hand, it is sufficiently open to enable transdisciplinary methods and provide a way forward for conceptions of practice employing networks that may be locked into specifics such as digital and internet-based forms and approaches.

Halsall highlighted two positive points about the framework that are consequential to its scope. Firstly, the “application of it applying to all art still has the specificity of being a network or systems thinking” and secondly “that it could be applied as a retrospective discourse” (Appendix E). Both of these are true. I have repeatedly mentioned in the research that networked art is a perspective of a type of practice, this perspective or network thinking is its specificity. The publication of Weiner's *Cybernetics* is a key date to the antecedents of networked art and, even though it is not a forming characteristic of networked art, all examples of networked art in chapters 4 and 5 were created after the invention of the internet. While both of these suggest an approximate timeline for networked art, I have purposefully not clarified its starting point. I have done this to avoid the suggestion of networked art as a movement. It could be argued that the perspective of networked art could be retrospectively applied to practices such as those discussed in chapter 3. Application such as this is in no way detrimental to networked art. However, I have not argued

this point one way or the other because the research intends to be constructivist of a framework for networked art as I practice it and have observed it in current practices. It is not deconstructionist and possibly revisionist of the history of art as this has no particular relevance to the formation of the framework.

In a final point on specificity Halsall added it was evident “that issue around specificity is in part what you are trying to respond to anyway” (*ibid*) and that part of the problem is that non-specificity is endemic of contemporary art post-Duchamp:

> “the condition of art right now is one that lacks specificity. If anything can be art, then we require a more abstract theory to be able to describe it. I think you could make the case that its very abstraction is a feature of its contemporaneity” (*ibid*).

Halsall's statement is partially correct. Simplification or abstraction in the framework has been discussed at length in this research as a consequence of the nature of diagrams. However, the framework has also been arranged in response to common features identified in practice that otherwise would not necessarily be grouped. This grouping of practice accounts for networked art being transdisciplinary but can equally be understood to be the result of non-specificity within contemporary art as a whole.

Interviewees were next asked if they felt the framework helped to classify a practice in a way that is useful for them as curators, theorists, academics, journalists and critics and/or useful for observer–users? For example, did it provide insight into artist's methodologies? Tedone stated that she considered the framework as “a theorisation of a set of practice in this current moment under a different angle … an interesting way to look at how things are actually operating but within a specific kind of language” (Appendix C). Tedone added, “I think it's a proposition that is useful, it's very conceptual … but sometimes it goes a bit overcomplicating or too complex” (*ibid*). This suggestion of currency and relevance echoed points raised by Halsall on the contemporaneity of what networked art is addressing, however, how it was being communicated may be unnecessarily complex. Some issues were raised by Bosma concerning a perceived rigidity of the framework and restrictiveness of some of its terms. Bosma expressed for example that the term artist embodied a positive role as

an artwork's author in the framework, what she termed as its “initiator” (Appendix D) and I have termed as the point of origin (see chapter 4.2). Conversely, user was questioned as being sufficiently active.

The role of the artist has been discussed and clarified in relation to established definitions of the artist's role. This discussion was purposefully undertaken as a result of the numerous transformations networked art implies, most notably in this instance the transformation of the process of creation to that of arranging. The role of the artist as it is described in networked art is in a sense expanded, extended or opened up to incorporate aspects of what might typically be considered as curation. Yet Halsall questioned whether retaining the term artist would be problematic as follows:

> “is there a problem in this model that actually by having the figure of the artist you are sort of reinscribing it back into a very traditional paradigm? So maybe you're not talking about specific medium, but the very figure of the artist is that not itself a very traditional figure, which is bound by notions of particular forms of expression and notions of creativity? As a question, should one of the things that are at stake in a framework such as this be that the figure of the artist needs to disappear because observer–user, artist and behaviour might all start to become conflated into one? Maybe, for example, the artwork element is a performative dimension in which case the behaviour becomes the thing that is looked at or is it maybe that the observer–user needs to be involved in the creative process of the quote-unquote artist?” (Appendix E).

While Halsall in retrospect said this was a rhetorical question, he makes several good points that require a response.

The behaviour between artist, observer–user and artwork element is, without doubt, performative, and this is as a consequence of the behavioural space that emerges within an artwork (see chapter 5.3). The framework allows an observer–user to be involved in an artist's creative process or rather it blurs to some extent the distinction between the two roles. Several points are raised in this research implying this. For example, an artist's arrangement and an observer–user's behaviour is procedurally

similar. They are only distinguished from each other in that arrangement is the initial act that identifies the artwork while behaviour is an ongoing act once the artwork is arranged. Once an artwork is arranged the artist can, similar to the observer–user, behave with the artwork. Finally, the artist is a context enabler implying that the artwork is, in addition to being a space of behaviour, a context and a framework that is open and accepts behaviour from all of its nodes. As such, there is a high level of similitude between the processes of observer–user and artist and each can be involved in the process of the other. Several examples of how observer–user and artist involvement occurs are discussed in relation to artworks throughout chapter 4 and this chapter. These include Ebon Fisher's installation at Test-Site, *Words* by Greyworld, *Fly Revolver* by David Bowen and my artworks *A network of people*, *Sculptures for Distant Places*, specifically *Sculpture for Mountains* and *Sculpture for Forests,* and *Remote Encounters*.

It is, however, unlikely as Halsall suggested that observer–user, artist and behaviour could within a type of post-art scenario become conflated into one node in the framework. Strategies of eliminating the presence of the artist, dematerializing (Lippard, 1997) the object or allowing the audience to define what is created or occurs have already been employed for many years within conceptual, performance, community and new media art to name a few. Several examples are mentioned in this research (see chapter 3). Throughout there has always been an artist initiating the artwork, even if only its concept, and an observer–user or audience that appreciates the artwork. A true or absolute consolidation of the two roles is impossible. As Bosma states the idea that the author no longer exists is in effect plainly incorrect (Appendix D), and networked art does not attempt to suggest this.

It is true that the term artist may more firmly reflect conventional paradigms of creating art as a consequence of long-established definitions of artist and their practice rather than the newer paradigms of practice discussed as part of the framework. This is a concern, however, it is important that the term artist remains in the framework for several reasons. Employing the term creates continuity within art. It connects with and as such incorporates established practices thereby allowing networked art to incorporate a variety of media, forms, platforms and so forth; in effect enabling it to be transdisciplinary. Additionally, artist is the only term in the

framework that can be understood at a glance because it builds on an understanding of such established practices. The definition of an artist in networked art does not fundamentally change what it always has been, it supplements or augments existing understandings of the term. As such, the artist is not just a networked artwork's point of origin, but it is also the jumping-off point for artists from established practices to understand and employ the framework. It is unclear whether the role of the artist in networked art can completely reflect the paradigm of practice it aspires to define or whether long-established definitions of artist and their practice will restrict it. Assessment of this will only be possible if or when networked art is adopted more widely and discussed by curators, theorists, academics, journalists and critics. Furthermore, it will no doubt depend on who is interpreting the term artist.

User has already been acknowledged in this research as a controversial and problematic term. A number of its issues have been discussed, however, not specifically whether it was sufficiently active. Alternatives suggested by Bosma such as participant, which was stated as being “much more active” and consequently “much more than observers and users” (*ibid*), have been discussed and considered. User was purposefully chosen as a result of its suggestion of activeness and how it could be juxtaposed with observer. It is debatable whether participant is more active than user, however, what is certain is that the terms are not equivalent. A participant implies cognisant collaboration by both the participant and artist. The purpose of participation is that what occurs is in some way known by another, which is not necessarily the case in networked art. If it were, it would dramatically reduce the possible combinations and configurations of nodes within artworks and exclude several of the examples given in chapter 4 and this chapter. A user, however, implies no such cognisance. A user may or may not be aware of collaborating with the artist, and equally the artist may or may not be aware of their contribution. The user's use is first and foremost for their own purpose, their appreciation of the artwork. Collaboration may or may not be an outcome of use. As such, participation is, in fact, a type of specific use. The discussed contrast of user with the conventional understanding of spectator and audience in art as well as the pre-systems studies observer with which it is juxtaposed in the newly formed term observer–user does explain that user is sufficiently active. However, to be clear, as discussed in chapter 4 neither observer nor user within the term observer–user should be understood as

merely passive and active binary opposites. They are integrally linked roles, each informing the other in behavioural cycles.

It is important to note that the perceived rigidity of the framework and the restrictiveness of some of its terms raised by Bosma both stem from explanations of the framework as a diagram supported with a brief verbal explanation. The explanation of the framework in chapter 4 of this research was not read by Bosma. Therefore, it is reasonable to conclude that the diagram of the framework while evidently communicating a certain amount of information without issue does not provide the level of depth contained in chapter 4. As discussed in detail in chapter 4.4 this is an issue with all diagrams and their simplification of information to facilitate communication. In accordance with the framework as a diagram that is seen from without an observer–user experiences an overview of the framework, in effect, they are *seeing the network* of the framework. However, reading chapter 4, an observer–user is immersed in the framework, that is they experience *being within the network*.

This conclusion is upheld by Tedone's statements that it was necessary to use both diagram and text to understand the framework fully and that to this end they complimented each other (Appendix C). By the time I interviewed Halsall, the third and final interview, the effectiveness of the diagram had been praised by one interviewee and indirectly raised as an issue by another. I decided, therefore, to directly question Halsall about his experience with the diagram and his understanding of the framework through it. He stated:

> “I think it would be perfectly possible to describe your framework without an animation actually. That's what you have done talking to me. So actually to me of the two experiences where I sat for an hour this afternoon and worked with the animation and looked at some of your work and so on and then this conversation, this conversation has been much more enlightening. I think you don't need the animation in order to understand your thesis as you just said there, your thesis is the presentation of this methodological framework describing art as being positioned between these four coordinates” (Appendix E).

The response, unfortunately, does not completely resolve whether the diagram is sufficiently effective in communicating networked art. Halsall suggests that the diagram is not required yet he places much emphasis on the verbal description I provided at the commencement of the interview. The problem, however, was whether the diagram could communicate the framework in scenarios where it would not be possible for me to provide a verbal explanation, such as when accompanying the written component of this research or when provided on its own. Providing an interactive and animated diagram of the framework was intended to increase the effectiveness of communicating the framework, and in particular as a network as diagram. While on its own it may not be sufficient, accompanying the rest of this research observer–users will have an augmented experience of the framework through the diagram thereby improving their understanding of the framework beyond the capability that conventional imagery can alone provide.

Responses to the remaining interview questions were almost unanimous. Interviewees were asked if there were any scenarios in their opinion that could be defined as networked art and could not be catered for by the framework. After discussion Bosma could not identify any, Tedone stated that the framework was "potentially very inclusive" (Appendix C) and Halsall remarked once again along similar lines that the framework potentially described all art (Appendix E). Each interviewee was asked if they were able to identify any issues with the framework, for example, conceptual gaps that are not addressed. Halsall stated he could not (*ibid*). Tedone spoke of the complexity of some concepts as a result of the multi-layered nature of the framework (Appendix C) suggesting improvement in how they are explained. Bosma raised a minor point about phrasing in the diagram that suggested artists practising networked art could not be spontaneous, which has since been rephrased.

I consider the outcomes of the interviews to be on the whole successful. No interviewee was fundamentally confused by the framework or misunderstood networked art. The framework can, therefore, be considered successful at communicating what networked art is, however, is the diagram a successful means to do so? Whether the diagram successfully communicates is unclear based on what the interviewees stated. Tedone, an advocate of the diagram, said it was

essential. Bosma neither clarified it communicated clearly or not. Bosma's impatience at the start of the interview and statement that I was repeating what she understood from the diagram (Appendix D) suggests that it was successful in communicating, yet subsequently, there was confusion on her part about several aspects of the framework suggesting the contrary. Halsall stated the diagram was not required (Appendix E), however, this was after it provided the initial basis of his explanation of networked art. In addition, of the three interviewees, Halsall proved to understand the implications of the framework and provided the most insightful and challenging discussion. It is evident from the interviews that the framework diagram lacks the depth that is provided in chapter 4 of this research and this comes as no surprise in relation to previous discussions regarding the simplicity of diagrams (see chapter 4.4). As such, the diagram is successful but only to suit particular requirements requiring a specific depth of information about networked art.

When I started this research, I asked, how can an art practice be established that is conceptually-based and transdisciplinary in its methods? How can it be removed from discussions of specific technology that may link it to a specific medium, aesthetic or position it within a movement that is reductively identified as new or post? I anticipated completing the research by summarising how the framework both identifies and enables a practice that is in all aspects networked. A practice that no longer had specific technologies, subject, media, form or platform as a shared commonality but instead a conceptual basis of being networked or connected in all parts of the artwork's produced and how that, in turn, leads to a *networked perspective of practice*. A conceptual basis of being networked consequently yields a transdisciplinary practice because artists can work across what is understood as conventionally separate practices within art as well as disciplines beyond art. In doing so artists eliminate or at the very least minimise the possibility of an aesthetic in networked art. As a result of being networked, networked art practice is therefore transformed. Employing some wordplay, I intended to explain that practice is not only transformed into being transdisciplinary, employing a unified knowledge from across or trans disciplines, but that disciplinarity itself is also transformed; that is that the trans of transdisciplinarity means both across and transformed disciplinarity. While the majority of this has occurred, I was incorrect in one key aspect. As I researched further into the artists I undertook case studies of in chapter 5, reflected

on my practice and completed the framework I realised that the artists discussed, including myself, are not transdisciplinary. Our practice is *postdisciplinary*.

Several factors led up to this conclusion. In the final year of this research, I wrote a journal article about a selection of my artworks positioned as what I termed post art (Lynch, forthcoming). In the article, I stated that the practice:

> "includes the questioning of media and form through postmedia, post-photographic, post-digital, post-internet and post-screen practices as well as addressing the manner in which the artist creates through post-disciplinary and postproduction methods" (*ibid*).

The article proposed a specific combination of colliding post influences in my practice that may not necessarily exist or be in the same configuration in other artist's practice and therefore should not be considered as necessarily a part of networked art. However, the idea of a post art practice, the culmination of thinking about a tendency I had identified in contemporary art practice that is centred around concepts of post and new and is discussed in relation to new media art (see chapter 3.3) formed the beginning of rethinking networked art practice as transdisciplinary.

An ongoing concept in art since the avant-garde, the majority of practices in art employing a new or post concept focus on technology, subject, media, form or platform. This approach continues more or less the same in contemporary art developments such as post-internet art, art created with full awareness of the internet, and the new aesthetic, a manner of seeing and visualising imagery that shifts away from the artist as author to machines, software and automated image processes. While each of these has an admirable aspiration to in a sense move beyond their current moment they are as a consequence of references to transitory technology, subject and media tied to that moment or the transition of that moment. As such, they have built-in obsolescence (see chapter 1.1). After reading *Your Everyday Art World*, which offered an alternative type of post art practice consisting of artists continually shifting between modes of practice and sites within which it occurred (Relyea, 2013), it was clear to me that networked art had some features described and could avoid being tied to a moment. How could this be achieved however when reference to specific technology, subject, media, form or platform as

the focus of what is new or post, which would consist of the replacement of one of these for a newer, could not be a consideration?

Halsall's question in the context of David Joselit's *After Art* (2012), itself a type of post art practice, of whether the artist would disappear as a result of observer–user, artist and behaviour becoming "conflated into one" (Appendix E), convinced me that this was not how networked art was a post art practice. The artist is fundamental to the concept of the framework and thereby networked art. The artist's role in networked art is both diversified and reinvigorated, expanded from its conventional process of creating to incorporate the process of identification, as a result of arrangement (see chapter 4.2). Consequently, the artist is in actuality more important than ever as they, in more ways than previously, are required to initiate an artwork. Examples of the artist's role as expanded are clearly evident in this research's case studies as well as my own practice as research through the variety of nodes created and identified and how they are arranged as a whole artwork. It was, however, the lack of specificity (*ibid*) identified as a strength by Halsall in the framework and networked art, which itself reflects the absence of specificity within contemporary art as a whole, that correlated with my original intentions of networked art being non-specific in technology and consequently form. Networked art practice is therefore not a discipline in itself, and it does not occur between or across disciplines, it is discipline specificity that it lacks and it is this that makes it postdisciplinary.

As a postdisciplinary practice networked art is not centred on being a new or post type of any specific technology, subject, media, form or platform. By applying the strategy of moving beyond specific technology, subject, media, form or platform employed in post and new art practices, as well as the non-disciplinary approach to networks employed by systems studies (see chapter 2.2), and applying it to disciplinarity it is instead *post the concept of disciplinarity itself*. Postdisciplinarity may be a relatively new topic discussed within contemporary art. However, all of its features have been in evidence for quite some time as part of what I have continually referred to as the grand-project of questioning conventional concepts of the art form in the modern era; specifically the role of the artist, art as object, the means of its creation and the role of the observer (see chapter 3.1). Networked art is a continuation of the grand-project as it addresses the combination of these issues

uniquely. The artists discussed in the research, including me, are in fact thinking about and practising their art without the discourses of specific technologies, subject, media, form or platform and all that accompanies it including disciplinarity, the designation of artworks as created in a medium or being referred to as site-specific.

Networked art is therefore not tied to a moment. It can be continually post any consideration of disciplinarity, including new disciplines that may emerge, and therefore can be relevant as long as the concept or metaphor of a network holds value in society. The concept of a network for networked art is a manner of thinking, a networked perspective, of practice that enables it to transcend the specifics of technology as well as subject, media, form or platform. As a result of networked art not being tied to a moment and its non-specificity, it can additionally extend back or retrospectively to interpret artworks in new ways and as such can be argued as existing before specific technologies such as electronic and digital technologies. As stated above the focus of this research is to construct the framework of networked art for current practices and it has therefore not been applied retrospectively. However, these factors combined strengthen the position of networked art as outside the possibility of being a movement.

Postdisciplinarity and a networked perspective operate cooperatively. Postdisciplinarity allows all technologies, subjects, media, forms and platforms as potentially possible to employ within networked art while a networked perspective enables them to be networked or connected into a whole artwork. Without postdisciplinarity, the application of a networked perspective in practice could not completely extend beyond specific technologies, subject, media, form or platform. Equally, without a networked perspective of practice, the need for postdisciplinarity in networked art would be negated or greatly reduced.

As stated in chapter 1, the framework is intended to have a dual-purpose of being applied by artists to their practice and employed by non-practitioners to form an understanding of networked art. This dual-purpose is incorporated into the networked perspective of practice. An artist thinks about and practices their art through the perspective of networks while an observer–user observes, uses and interprets artworks through the perspective of networks. Networked art, therefore,

places emphasis on an individual's understanding and how it is formed through combinations of action-based and cognitive behaviour. It is not about unifying artists as a group or even as a network, that may or may not occur, nor is it necessarily intended that artists would self-identify as networked artists. In fact, artists may employ the perspective of networks continuously, often or only occasionally as they see fit if networked art is to be considered genuinely as a postdisciplinary art practice with a condition of non-specificity symptomatic of contemporary art (Appendix E).

I have continuously employed a networked perspective in various ways in all my practice as research. It has enabled me to arrange artworks that employ numerous combinations of technology, subject, media, form and platform. In addition, I have arranged contexts that I had not previously thought possible as artworks and operated across disciplines and roles that I would not typically have considered. This is most evident in *Remote Encounters* for example, which allowed me to all at once be organiser, chair, curator and artist arranging the social situation of a conference as a performative artwork (see chapter 5.3). The framework allows me to understand my practice in a way that is not based on specific technology, subject, media, form or platform. What had formerly seemed to me to be an inconsistent practice from a disciplinary approach, not working through a medium, developing a theme or employing a particular style, is now from a postdisciplinary approach conceptually coherent when explained through the framework.

Understanding my practice through the framework has consequently enabled me to prioritise the act of arranging artworks in order to allow behaviour and space to emerge rather than what is arranged and how, which tend to be associated with discipline, medium or style. *Remote Encounters* demonstrates this focus on arranging, behaviour and space in that the artwork is performative, manifests as an event and leaves few artefacts, 'real' or 'virtual', once complete. For other artists, I hope that the framework and the networked perspective that networked art enables will serve the same purpose of enabling them to understand their practice through a postdisciplinary approach. However, at the very least the framework provides other artists with a working model of how issues of disciplinarity may be addressed. For non-practitioners, the framework provides a unique insight into a type of contemporary practice by affording a first-hand account of the structuring of a

practice.

So finally how do networks transform contemporary art? Networks are transformative to contemporary art practice in a number of ways. Each transformation can be understood to correspond with the nodes of the framework but also how the framework and as a consequence networked art is located in contemporary art and culture as a whole. Additionally, the transformations directly address the grand-project of questioning conventional concepts of the art form in the modern era and as such form a continuation of it. The role of the artist is transformed from what is typically compared with the role of an author to incorporate the roles of observer and user. This transformation identifies the possibility of an ongoing relationship with an artwork on its completion, either directly through a performative role or indirectly in how it influences subsequent artworks by the artist or other artists. The role of the observer is transformed into the role of observer–user. It is not just a transformation from a cognitive to an action-based role as has occurred in many other types of art, but the identification of both cognitive and action-based roles as equally important and their consolidation into a new role. An artwork element is transformed initially through arrangement by an artist and subsequently through behaviour by an observer–user or artist. Equally, however, the artist arranges an observer–user, that is they define how the observer–user is positioned within an artwork and determine what behaviour is available to them, while the observer–user may behave with an artist, directly in performative scenarios or indirectly through action-based feedback. In each of these instances, the transformation that occurs to artwork element, observer–user or artist is specific to the arrangement or behaviour that occurs, whether it is cognitive or action-based and the artwork it occurs within.

Specific transformations discussed within case study artworks throughout chapters 4 and 5 provide demonstrations of specific arrangement and behaviour. The node behaviour, an emergent property within the framework, can be understood to be an enabler of transformations that occur as a result of nodes acting on each other. Transformations such as the dematerialization (Lippard, 1997) of artworks from physical to digital, 'real' to 'virtual' as well as the transformation of artworks from objecthood (Fried, 1998) to behaviour also occur within networked art, however, are

far from unique to it. What is instead proposed as unique is the ability for them to co-exist as a cohesive artist's practice as a consequence of the postdisciplinary nature of networked art, that is disciplinary art practice itself transformed.

With all these transformations occurring within networked art only one conclusion is possible concerning the relationship between networked art and transformation. A networked artwork, conceptually based on networks, arranged to facilitate connections and subsequently becoming a space of behaviour, is effectively inseparable from transformation at every level. This inseparability from transformation suggests that networked art could itself be potentially transformative beyond the confines of art practice, for example within culture influencing how we understand and shape it or within society influencing how we behave with each other and the world around us. While assessing this is far beyond the scope of this research there are indications within some case studies discussed, such as Ebon Fisher's ambition to influence social behaviour or David Bowen's attempts to raise awareness of the natural world, that this may be possible in modest ways.

Chapter 6: Conclusion

6.1 Conclusion

At the outset, this research proposed networked art as a practice that emerges from the problem of contemporary art's relationship with technology. Specifically its consideration of networks as largely technological and consequently art that employs networks as technologically determined. The issue of technological art's dependency on specific technologies, predominantly current forms of electronic and digital technologies, and the built-in obsolescence it incorporates for art are discussed as the principle reason for redefining the role of networks in contemporary art. Three questions are posed as the focus of the research:

1. How can a contemporary art practice continue to engage with technology and yet not be defined by technology?

2. What might such a practice consist of and how might it operate?

3. How would the art practice be transformed as a result?

This chapter will conclude the research by summarising it, its outcomes and issues, its impact on contemporary art practice, including my own, and suggest avenues for further research.

The research contextualised networked art within a combination of network history that explored the emergence of networks (see chapter 2.2 and 2.3) and relevant contemporary art practice. Contemporary art antecedents of networked art established that art employing networks existed before or outside the influence of electronic and digital technologies as well as technological networks such as the internet (see chapter 3). Therefore, art employing networks originated independently of these specific technologies. A selection of case studies of artists in the era of technological networks subsequently established (see chapter 5) that art employing networks continues to evolve during the era of technological networks. From Suzanne Treister's technological networks as subject matter, Greyworld's use of technological networks as behavioural form to Émilie Brout and Maxime Marion's use of technological networks as performative space, networked art avails of the latest or current specific technology. However, in the practice of Ebon Fisher, David Bowen and Jérôme Joy there are other types of networks at play including biological, social,

interspecies and interplanetary.

Antecedents and case studies of networked art combined demonstrated that networked art could be sustained as a practice while technologies evolve, become obsolete and are replaced. Consequently, networks were proposed as a conceptual basis of networked art rather than a technological basis. The conceptual basis demonstrated a shift from the use of specific technologies and wider processes, themes or content within technological art to a practice that instead employs networks as part of specific processes, themes or content and the option of a variety of technologies. Networked art is as a result not technologically determined and therefore not dependent on specific technologies.

To demonstrate what networked art consists of and how it operates, a framework for networked art was developed (see chapter 4). The framework emerged from a combination of my practice and the observation of the practice of other artists over a number of years contextualised by the history of networks (see chapter 2) and positioned in relation to art developments (see chapter 3). Each practice demonstrated an engagement with networks as a conceptual basis of specific processes, themes or content essential to the practice and not exclusively as a specific technology. Practice continued aspects of what I have termed as the grand-project of art in the modern era, that is questioning and reconfiguring the role of the artist, art as object, the means of its creation and the role of the observer (see chapter 3.1). These factors were employed to inform the conception of the framework in such a way as to provide a structure that can be applied by an artist that is neither conceptually restrictive in how they carry out their practice nor prescriptive regarding their choice of subject, media, form or platform. Additionally, the framework provides a means of explaining networked art that does not rely on specific technology, subject, media, form or platform.

The framework detailed four parts or nodes of networked art as artist, observer–user, artwork element and behaviour. The framework is itself a network and was conceived as a diagram that is a map or a plan employed to create with rather than an image that represents (Watson, 2009, p. 12). Employed in this way by an artist the framework enables nodes to connect or link through the process of arrangement,

and it is the subsequent behaviour of these nodes that constitutes an artwork. In my practice as research the framework has enabled me to conceive of each artwork in this way (see chapter 4 and Appendix A). However, over the course of all of my practice as research and the continuation of my practice beyond this thesis the framework provides a conceptual basis that allows me to develop my practice cohesively as a body of work. In the case studies discussed it is each artist's networked perspective of practice, that is how they consider nodes through various combinations and recombinations give rise to an artwork as a whole, which unites the case studies as networked art. How this is achieved has been elaborated in detail with relation to each artwork discussed (see chapter 5) and is also demonstrated through the artworks I have developed as part of my practice as research. While the case studies of artworks by other artists demonstrate the framework applied to existing artworks in the manner a curator, theorist, academic, journalist or critic would, my practice demonstrates the framework applied as an artist's conceptual basis to the development of artworks.

Contemporary art practice is transformed on many levels. These are principally framed within what I have termed as the grand-project of art in the modern era; that is the transformation of art as object, the means of its creation, the role of the artist and the role of the observer. Each is discussed in-depth, related to the case studies as well as my practice as research. Additionally, specific examples of transformation present in the case studies and my practice as research have been discussed. It is, however, the transformation of a contemporary form of practice understood from a disciplinary viewpoint, even if it is interdisciplinary or transdisciplinary, to a postdisciplinary practice that is ultimately the most significant transformation.

The practice of networked art was at the outset of the research provisionally positioned as transdisciplinary. However, transdisciplinarity's definition of traversing or crossing disciplines is potentially problematic. It suggests that networked art is associated with those disciplines, or their combination, and consequently would return networked art to being identified with specific technology, subject, media, form or platform, in effect defining it as simply a new discipline. Instead, the research has applied a strategy employed by post and new art practices, in particular, post-technological practices such as post-digital and post-internet practice, wherein these

practices move beyond digital media and the internet as defining forms. This strategy of moving beyond is applied to the concept of disciplinarity itself in networked art and has thereby enabled it to be postdisciplinary (see chapter 5.4). As a result, any suggestion of networked art practice as defined by specific technology, subject, media, form or platform is removed.

By moving beyond disciplinarity the impact on contemporary art practice is significant. In my practice, for example, I now consider a much wider set of technologies, subjects, media, forms and platforms as potentially possible to employ in creating networked art. In turn, I am more fully able to achieve a networked perspective of practice, that is the conceptual basis of being networked or connected in all parts of the artwork produced, because there are fewer limitations as to what parts can be, how I can explore and combine them, and consequently how diverse the practice can be. Postdisciplinarity and a networked perspective of practice are therefore understood as mutually assistive (see chapter 5.4). My practice as research and case studies discussed in the research have demonstrated numerous combinations of technology, subject, media, form and platform as well as how artists have engaged with them across what would have conventionally been considered various disciplines. As such, they provide examples of the application of a networked perspective of practice and how networked art is postdisciplinary.

This research redefines the role of networks in contemporary art and presents an alternative non-technologically based understanding of how they are employed in current practices to that presented in existing studies and literature. As such, it contributes to the discourse of contemporary art and its relationship to technology. The research's findings, the framework and examples of how practice is transformed, demonstrate a manner for practitioners to develop practice beyond the confines of current specific technologies and the obsolescence they entail. Furthermore, by proposing networked art as a postdisciplinary practice, the research provides an alternative solution to the issues within discourses around forms of post-technological art. For non-practitioners involved in the discussion, theorisation and criticism of contemporary art the findings provide a unique first-hand insight into the structuring of networked art and subsequently demonstrate it in practice. While the research surpasses the depth of enquiry in existing studies and literature on current

contemporary art practices that employ networks, it is its alternative understanding of such practices as a consequence of its reading of their histories that is of significant value to the practice and theory of contemporary art.

The scope of networked art being perceived as too big (Appendix E) and an artificially intelligent observer–user being developed at some future point (see chapter 4.1) are two problematic findings of the research. While the former constitutes an immediate limitation of the research in that it potentially diminishes the applied usefulness of the framework, the latter is currently only an eventual or possible limitation. Both issues can, however, be rectified. Networked art's scope can be addressed within the specifics of each artist's practice through the artist's manner of employing processes, themes or content and as such is a potential avenue for further practice-based research. If an artificially intelligent observer–user is developed at some future point changes to the framework will be required such as redefining the terms of cognitive and non-cognitive nodes. The implications of this are considerable and include the effect it will have on networked art's understanding of the processes of arrangement and behaviour as well as the potential collapsing of distinctions between artist, observer–user and artwork element referred to by Halsall (Appendix E). Further research will, therefore, be required to address this if or when it occurs.

The research's most evident avenues for further research, however, lie in the identification of networked art as a postdisciplinary practice during the late stages of the research. For the networked artist, further research may include practice as research that explores combinations of technologies, subjects, media, forms and platforms that may previously have been considered outside the discipline of a networked art practice. How these open up or challenge an understanding of networks in practice and the behaviours and spaces they yield could extend much further than examples discussed in this research. For researchers of contemporary art practice addressing disciplinarity, post and new art practices, further research may include how networked art as postdisciplinary precisely relates to emerging post-technological art practices. Research could specifically explore comparisons with post-digital and post-internet practices within a post-media era (Guattari, 1985), including their use of similar shared strategies of moving beyond technology, subject,

media, form, platform and discipline. However, research may also include how postdisciplinarity coincides with theories of the end of art or after art (Appendix E) and the suggested demise of aesthetics in contemporary art. Each of these suggested avenues of research requires an in-depth exploration and investigation that is beyond the intent and scope of this research.

Glossary

Action event: In networked art, an action event is *a physical event that occurs between parts or nodes within the context of an artwork* (see entries for action event and node). These events include: between user (see entry for user) and artwork, between something external to the artwork but other than a user and the artwork and between parts or nodes within the artwork.

Act of creation: The act of creation is one of two processes that occur in the conception of a networked artwork. It is *the creation of something new as a node* (see entry for node), which conforms to the conventional method employed by an artist.

Act of identification: The act of identification is one of two processes that occur in the conception of a networked artwork. It is *the identification and designation of something that already exists as a node* (see entry for node), which in a sense consists of a form of appropriation.

Arrangement: *A networked artwork is conceived through the arrangement of nodes by an artist* (see entry for node).

Arrangement can occur through two processes. The act of creation is the creation of something new as a node which conforms to the conventional method employed by an artist (see entry for act of creation). The act of identification is identifying something that already exists and designating it as a node, which in a sense consists of a form of appropriation (see entry for act of identification). Both processes of creation and identification are carried out through action and cognitive events (see entries for action event and cognitive event).

Artwork element: An artwork element is a node in a networked artwork that is not an observer–user or artist (see entries for node, observer and user). Consequently, it is a non-cognitive node.

Behaviour: Behaviour is *the combination of action and cognitive events between nodes following their arrangement in a networked artwork* (see entries for action event, cognitive event, node and arrangement). As such, it can be considered as all rearrangements of an existing networked artwork's nodes.

Cognitive event: In networked art, *a cognitive event is a mental event that occurs between*

an observer–user or artist and an artwork (see entries for observer and user). Unlike an action event (see entry for action event) a cognitive event must involve an observer–user or artist as user.

Context enabler: Context enabler is a synonym for artist. It *describes the artist's role in relation to nodes of a networked artwork as defining a context or scenario* (see entry for node). It may entail defining a context for cognitive or non-cognitive nodes. In a sense the artist as context enabler can be considered similar to a programmer who creates a programming framework, that is a set of programming tools to address a specific problem built with a particular programming language.

Node: A node is a p*art of a networked artwork*. There are two types of nodes. Cognitive nodes such as the artist and the observer–user are nodes with the ability to perform a cognitive event (see entries for observer, user and cognitive event). Non-cognitive nodes such as an artwork element are nodes that can only perform action events (see entries for artwork element and action event).

Observer: An observer is *an individual that observes an art or media form. They are physically passive in relation to it*. In networked art, the role of the observer and the role of the user (see entry for user) are closely connected and termed the observer–user.

In art prior to the modern era, the observer is synonymous with spectator. Action and observation in art prior to the modern era are respectively parts of the roles of artist and observer and as such considered separated. In art in the modern era, in particular in technology-based art, action becomes a factor in the appreciation of art, and therefore the term user replaces observer. In networked art, the observer has an 'action'. It is termed a cognitive event, which describes the mental processes that occur on the part of the observer when they observe an artwork.

The use of the term observer in this research refers to William Ross Ashby's definition of the role of the pre-cybernetics and systems theory scientist who observes the outcome of an experiment without physically intervening (Ashby, 1960, p.16).

Point of origin: The point of origin in networked art refers to the origin of an artwork. It is, in essence, a *synonym for artist*.

It can be considered a term for the early stages of the artist, that is while the artwork is being conceived (see entry for arrangement). The artist is also the context enabler a term that

describes the artist's role in relation to nodes of the artwork (see entries for context enabler and node).

'Real': 'Real' is *that which exists, regardless of whether it is material or immaterial, and is experienced*. What is 'real' consequently incorporates what is 'virtual' (see entry for 'virtual'). For a full discussion of 'real' and 'virtual', please see chapter 1.3.

User: A user is *an individual that is physically active in relation to an art or media form*. In technology-based art a user's action is termed user-based interaction however in networked art it is termed an action event (see entry for action event). In networked art, the role of the user and the role of the observer (see entry for observer) are closely connected and termed the observer–user.

The origins of the term user are unclear however its use in relation to art and media forms most likely lies within computing. It is reasonable to speculate that researchers such as Donald Norman, who coined the term user experience, employed it with the intent that it reflect prior uses from outside the context of computing, that is interactions in everyday scenarios with material objects.

'Virtual': The 'virtual' is *that which exists but is specifically immaterial*. It is therefore experientially a part of what is 'real' (see entry for 'real'). For a full discussion of 'real' and 'virtual', please see chapter 1.3.

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Appendices

Appendix A

Nine artworks were created as practice as research (PaR) for this research. They were exhibited as part of the exhibition *Transformations*, which occurred at Borough Road Gallery, London from the 23rd to 30th of June 2017. The following six artworks are discussed as examples in this research:

- *A network of people who attended an exhibition and contributed to the creation of this work* (Lynch, 2014)
- *Transformations: Actions to Matter / Matter to Actions* (Lynch, 2015–ongoing)
- *Sculptures for Distant Places* (Lynch, 2014–16)
- *The Distinction Between Here and There, Now and Then* (Lynch, 2013 c)
- *This is Real Virtuality* (Lynch, 2013–14)
- *Remote Encounters: connecting bodies, collapsing spaces and temporal ubiquity in networked performance* (Lynch, 2013 a)

The following three artworks have not been discussed in this research:

- *Auction Action – Commission an Artwork* (Lynch, 2017 b)
- *Tran$actions* (Lynch, 2015–2017)
- *We Entomb Memoir* (Lynch, 2015)

Appendix B

Ebon Fisher. 2016-17. *Discussion with artist Ebon Fisher about his practice*. Interviewed by Garrett Lynch. [chat transcript] Facebook 17/12/2016–22/01/2017.

Ebon Fisher is an American transdisciplinary artist. He is widely recognised as one of the pre-web researchers of network culture. In the early 1990s, he co-founded the art movement *Immersionism* in Williamsburg, Brooklyn, New York. He has previously taught at Rutgers University, Moore College of Art and Design, De Paul University, Stevens Institute of Technology and the MIT Media Lab.

Sunday, 18 December 2016 at 15:33 UTC
Ebon: I'm honored that you're writing about my practice. I'll have to read it to get a grip on what it is … What is your thesis?

Sunday, 18 December 2016 at 18:22 UTC
Garrett: … My thesis is called The Transformative Nature of Networks within Contemporary Art Practice. I'm developing a framework and a practice that aims to move art that employs networks (as form, subject etc.) beyond the dead end it has reached with developments such as net art and the singular location/platform/technology of the web. The spirit of it is to try and communicate the 'networked' matter-of-fact approach many practitioners are using, almost a Castellian seeing networks everywhere attitude, that they are then applying across a number of media/forms/contexts etc. In a sense this is what post-internet art is also trying to do, but that creates so many issues it's unworkable in many respects (and I suspect the reason it was killed off so quickly). I'm looking at a number of practitioners as examples of what I'm defining as a networked art practice, those who are thinking about networks in a much larger sense, which is where your practice comes in. There is a section which discusses your work and Suzanne Treister's - very different formally (part of an argument about networked art being transdisciplinary) but with some very similar goals. I'm still completing the chapter but happy to forward you the section once it's finished. Your thoughts would be very useful if you have the time.

Sunday, 18 December 2016 at 22:06 UTC
Ebon: I like where you're going with that work. I explored a network approach to work in Williamsburg, Brooklyn, helping to build a community … but soon realized that as with neurological systems, a community is not just the network, but an entire resonating emergent organism. Neuroscientists have identified fields of interaction between neurons which makes

their complexity that much greater. Hence my driving metaphor left behind the machine back in the early 1990s and has been ecological ever since. I'm tempted to go one step further, but fear losing my audience! My latest project, The Nervepool, puts a toe in some very strange waters. It's a ridiculously ambition project involving virtual sets, performers, numerous screenplays and revisions, studies, a series of producers – a couple were too commercial, one who, heartbreakingly, passed away, and one who was pulled away by Leonardo di Caprio to work on a documentary about the environment with my blessings. It's a process!

Sunday, 18 December 2016 at 22:12 UTC

Ebon: … also I moved from “Bionic Codes” to “Zoacodes” for the same reason. The machine (bionic) is a myth. But so are living systems. 20 years ago I began to grow a philosophy over the internet called Wigglism (which you probably stumbled upon and puzzled over), which attempted to move past an objective view of living things and into a shared sense of vitality. Considered calling it “neovitalism” but that got too sticky. I've preferred to leave the terms hanging and let terms emerge through the process of collaboration. The strange thing is, while oodles of lovely people dove into the body of the Wigglism Manifesto, no one took on the term itself …

Sunday, 18 December 2016 at 22:14 UTC

Ebon: But you'll have to let me know if any of the above sounds like me. I'll be happy to evolve to fit your thesis.

Tuesday, 20 December 2016 at 12:30 UTC

Garrett: Yes I initially had some difficulty understanding your development from Bionic Codes to Zoacodes, but you are quoted somewhere as explaining it as a development of thinking that moves from circuitry to biology, which suddenly makes it much clearer. My thinking about networks is different as well, I don't understand the term as necessarily electronic/digital or as you said wrapped up in a machine metaphor. That's really a product of our time and the dominance/high profile of that form of network. The etymology of the word network predates electronic/digital, and even the industrial revolution and the origins of how we visualise networks predates that substantially. The visual research of anthropologists Schuster and Carpenter are really interesting to look at in this respect. Networks are for me are purely about connecting anything in any context. I'm not redefining the term network but attempting to return its meaning to a wider more inclusive definition. I'm calling this a networked perspective, and for me your current approach of ecological/biological thinking is networked. So in a sense, we are thinking similarly, beyond machine metaphors, but distinctly as yours is focused on what I would call emerging or future definitions of networks (but ironically do refer back to pre-machine) and mine is all types of networks that have been, are and will be. Both

perspectives are completely compatible.

Tuesday, 20 December 2016 at 12:35 UTC
Garrett: My perspective is not without its problems, as you said networks do have limitations. One issue was the idealism of non-hierarchy which I think I've resolved, but the other main issue is how do networks not become everything. In a sense they do, I've not resolved this, but I don't need to as I'm only discussing them within the context of art. Personally, I'm not sure it should be resolved, perhaps a networked way of thinking needs to involve everything.

Tuesday, 20 December 2016 at 12:58 UTC
Garrett: Yes I've been reading about Wigglism as well. I obliquely refer to its concept of subjective truth in a point I brought up on your practice and then comparably with Suzanne Treister's practice of merged truths and invented narratives. I think however for the academic world, certainly PhD level, the idea of subjective truth is too controversial as it's still stuck in a horrible science paradigm of labs, observation, experimentation and documentation. Even practice as research is still a hot topic for supervisors lagging far behind their students who usually do it quite fluidly just lack some key skills as to how they articulate it.

Tuesday, 20 December 2016 at 13:04 UTC
Garrett: “But you'll have to let me know if any of the above sounds like me. I'll be happy to evolve to fit your thesis” - Joke? :) (always difficult to gauge in chat) No seriously though my framework needs to be open so that it accommodates the practice I'm seeing and making. It should work for all those practitioners I've written about without them adapting, without them seeing it as a manifesto or even necessarily seeing it or acknowledging it at all. Just keeping on doing what you're doing and maybe have a show somewhere in Europe

Tuesday, 20 December 2016 at 21:12 UTC
Ebon: Thanks for your thoughtful response. It was definitely a joke! As one who explores culture/media/information as a living system I no longer assume there is an objective truth – only vital convergences. Hence the idea of adaptation to each other's context, to some extent, is inevitable … The classic view is that we stand aloof and report objectively … but that is based on a colonialist view of the superiority and objectivity of the (European) academy. Collaboration with each other and with one's environment (which is another player in a communications event) to arrive at a vital system might be a sound alternative. That vitality is at the core of the Wigglism experiment. That doesn't mean one must assume one can say whatever one wants and that becomes the Truth … (as in the Trump campaign/presidency) … because we are ALSO collaborating with the natural world outside the hysterical human sphere. And nature has some very strong opinions!

Wednesday, 21 December 2016 at 05:09 UTC

Ebon: RE. “subjective truth”. Some good thoughts above. I don't think I've ever spoken with great fondness for either objective OR subjective truth. Subjective ecology (which is another variant on “merged truth” perhaps?) on the other hand is something I've explored since participating in the Immersionist scene in Williamsburg, Brooklyn, in the early 1990s. An entire generation of artists immersed themselves in both each other's worlds and in the local environment. We GREW a truth out of a burned out, post-industrial wasteland. That process was so successful, sadly, a wave of real estate developers exploited what we started (and we were not the so-called gentrifiers, the developers were). I'm working with another PhD. candidate from Paris, Côme Pérotin, who is writing a chapter on Brooklyn's exploitive housing economy in a book I'm co-editing on the Immersionists. If you have any ties to, or experience with, N. Brooklyn of the 1990s you'd be welcome to contribute as well. … where, BTW, are you studying in England? (and sorry for the long, sprawling thoughts!)

Thursday, 22 December 2016 at 11:47 UTC

Garrett: “I no longer assume there is an objective truth – only vital convergences. Hence the idea of adaptation to each other's context, to some extent, is inevitable …” - This is fascinating, I hadn't thought of taking subjective truth to that extent - and yes your absolutely right of course truth here is a misnomer but I kind of like it as it helps to emphasis the problems of what it potentially means, it's on a par with postmodern or my particular bugbear virtual. This would make a great undergraduate art project/exercise for students - place yourself in the context of the Other (with all phenomenological/philosophical meanings of that as an introduction). It could also be a nice lead into ideas of post-truth, which I think the very concept of and what it stands for has a terrible potential for harm but is now, unfortunately, part of contemporary experience and should be discussed. That's very kind of you to invite me to contribute, and if I knew anything about the topic or had experienced it I would jump at the chance, but unfortunately, I don't so I don't think I could add anything of value. Yes, that's correct, I'm completing my PhD in 2017 at South Bank University in London. I'm Irish, moved to England to study when I was 18 and since then have followed my studies and subsequently teaching throughout England, France and Wales. Sprawling thoughts are good, I suspect the discussion on objective/subjectiveness (whatever we call it) may well feed into what I'm writing, so it's all good!

Thursday, 22 December 2016 at 12:28 UTC

Garrett: Actually seeing subjective truth and post-truth next to each other in writing, I'm now liking it less. It seems to me it would need to be more clearly delineated as a concept as it could be assumed and argued that subjective truth is just part of post-truth.

Thursday, 22 December 2016 at 18:19 UTC

Ebon: Hello again, fellow Irishman! (well, I had a handful of ancestors). And so … in regards to some of the above: “Subjective truth” is indeed folded into post-truth. It's an old concept. I wrestled with it over 25 years ago, and I think I got past the whole debate. (I wrote in a notebook in 1989: “There are no absolute truths, only a tendency for half truths to correlate.”) One has to approach the entire issue quite differently to arrive at a new conception of reality, but unfortunately, most people plod along in a linear fashion from objective truth to acknowledging there is discord among differing points of view and different cultures, to post-truth. They don't see the discord as, in fact, a feature of the shared subjective continuum. It's seen as a problem rather than an inherent feature of reality. I'd suggest moving from objective truth to acknowledging differing points of view, and then DEEPENING the idea of a conceptual jungle. Many philosophically inclined folks seem to say “Yuck! I don't like all this discord and debate, so I'm going to shut the door on the noise and jump to the next obvious philosophical position which is Post Truth or Post Modern. In 1990 I posted a piece of street propaganda in Williamsburg and the East Village titled “You Sub Mod.” It introduced the idea of SUB modernism as opposed to POST modernism. By sinking into the loam beneath modernism, some very interesting things emerge. That is, connecting with something more environmentally rooted may be a better path to take rather than moving past the thing in question. Since you're Irish and a good chunk of my ancestors are the same, we'll have to get to the bottom of this over a Guinness. I honestly believe that people meeting in actual rooms can better discuss the concept of subjective ecology (as opposed to subjective truth) and the difference between my proposal for SUB modernism rather than POST modernism. When one is in a room the idea of immediate, environmentally rooted connection is that much more visceral. The act of gesticulating, uttering sounds, pointing to the beautiful cracks in the wall, etc. makes the notion that our conveyance of statements has always been part of the world we are attempting to define. The immediate smells, digressions, and feedback from those in a conversation reminds us that there is no such thing as a complete thought and that what we are actually doing when communication is happening is cultivating a social organism (or from the standpoint of subjective ecology, we're forming what feels like a vital system with no precise boundaries and no map). Wigglism defined the terms for all of this in 1996. It was rooted in a very dynamic art scene in Williamsburg, Brooklyn. I was able to test out my theories in my media rituals, and there were plenty of philosophers around to bounce ideas off of like Kit Blake (now in Rotterdam), Ethan Pettit (still in Brooklyn) and Pegi Vail (still in Williamsburg and teaching at NYU and making documentaries). Ever get to New York much? The Guinness is on me if you're passing through. Also … since you're interested in the idea of the “virtual”, you'll have to look up my wonderful friend Joseph Nechvatal, a writer and artist now living in Paris. He coined the term “viractual” to encompass the physical and virtual

continuum. As for me, I no longer worry myself over “objective truth” and “virtual reality.” They both assume there's some kind of definitive separation between two realms (objective/subjective and virtual/real). I believe we live in a complex shared dream space with a lot of folding and shadows – i.e. a subjective ecosystem. It's a continuum of spirit/emotion/sensation (and the terms change and evolve because I cannot, by definition, define it and can only pull others, like yourself, into a dialogue about it). Here's an article of mine you may have seen already, but it attempts to get at some of this: https://www.researchgate.net/publication/232851171_The_future_of_wiggling_things

Sunday, 25 December 2016 at 11:31 UTC

Garrett: Yes discussion online always loses a lot of nuances, looks, body language etc. which of course are extremely important in any discussion about truth/perspectives/points of view. All of what we are saying here about our ideas of subjective truth (or again whatever we name it) has been permeated with positive, perhaps idealistic but let's hope not, undertones and is a result of collective consensus. Post-truth seems to me to be about the 'truths' of the few being imposed on the many - really on a par with propaganda. Have you seen Adam Curtis's Hypernormalisation? It's interesting in that it explores this quite well but very problematic as well because of the way Curtis moves from one topic to another, positioning them/juxtaposing them in certain ways and the traditional documentary voice-over it uses - in a sense he uses post-truth not just as the documentaries topic but also as a means of structuring the documentary. Yes, I'm familiar with Joseph Nechvatal, he's an ex-student of Roy Ascott. I didn't know had a term for the physical and virtual continuum. Clearly, it's in part Deleuze inspired. I'm going to track this down to see what he says about it, it could be very useful. Thanks for telling me this. I have already read your paper, but thanks for sending me the link. I'm of the same opinion about 'real' and 'virtual', they are no longer distinct or opposites (if they ever were). For me the term is a problem because it exists so rather than not employ it I tend to purposefully use it, problematise it, as a means to frame related problems and frequently as a means to generate works. Exactly as you said, I use it to create dialogues really. Unfortunately, I'm almost never state side, but that may all change post PhD. If I am, I'll take you up on that drink. I'll have to introduce you to Murphy's if you've never tried it, much nicer than Guinness and brewed in my hometown. Have a good holiday break, whether you celebrate it or not, I'm sure you've got some downtime.

Saturday, 14 January 2017 at 01:37 UTC

Ebon: Hi Garrett, let me know if you have any more questions. I'm back at work and trying desperately to ignore the ending of our democracy and the rebranding of America as Trumpland …

Saturday, 14 January 2017 at 17:16 UTC
Garrett: I'm good, the chat was useful. I'm finishing my chapter over the next month and will fold some of what was discussed back into the section about your work. Will forward to you once it's done if you want to read it. Keep up the good fight, the next few years will no doubt be difficult, but hopefully, impeachment will happen - although track record of that being a success against a president isn't good. Talk to you soon.

Saturday, 14 January 2017 at 20:58 UTC
Ebon: Garrett, I'd love to see what you wrote. I'm at ****@****.***.*** or ****@*********.***

Sunday, 15 January 2017 at 10:07 UTC
Garrett: Great thanks very much Ebon. Will forward when it's done.

Saturday, 21 January 2017 at 14:15 UTC
Garrett: Hi Ebon, this might interest you given our recent conversation - http://www.**********.com/*****.html

Saturday, 21 January 2017 at 22:28 UTC
Ebon: Hi Garrett, Happy Protest Day!!! (Send my thanks to the Londoners who joined the Women's March in Washington DC.)

I hope that there's been enough out there for you to get a sense of the “sub modernist” approach to truth that Wigglism represents. It's not so much that all truth is subjective, but that we have always had to take a collective/ecological approach to coming to terms with it (and I say collective/ecological because we are not just people but ecosystems) … and the litmus test of a collective truth is the sense of vitality felt by that eco-community. In other words, the truth is a vital social-ecological organism. Which leads to subjective ecology. (And, again, that's NOT subjective truth, it's subjective ecology). I hope I'm not being irritating in my attempt to clarify this point. For more on my work, here's a link to a London-based theory journal you might not have come across: http://www.metamute.org/editorial/articles/absorb-memory-ebon-fishers-media-organisms

One more thing: The Immersionist scene in Williamsburg, Brooklyn, in the 1990s is indicated by that article. The article doesn't use the term “Immersionism”, but it gets the flavor pretty well. Immersionism was an important creative scene, and it involved an aesthetic of deep participation in a local ecosystem. That easily lead to a Brooklyn renaissance, and I'm currently co-editing a book about the Immersionists with Zori Ilene Magaras. (If you want to thoroughly cover my work you'll need to at least casually mention that I was one of the

pioneers of that scene). Here's another article and radio interview which links me to that scene more clearly: http://museumofnonvisibleart.com/interviews/ebon-fisher/

Sunday, 22 January 2017 at 13:55
Garrett: Hi Ebon http://www.metamute.org/editorial/articles/absorb-memory-ebon-fishers-media-organisms yes had already read this and listened to this http://museumofnonvisibleart.com/interviews/ebon-fisher/.

I don't think I can honestly say I'm covering all of your work, there is too much in terms of theoretical content there and the chapter section needs to be about 3000/4000 words shared with Suzanne Treistler and pulling in my own practice (ultimately the chapter needs to place my own practice as demonstrative of a framework I'm building). It's a snapshot really of the codes, their purpose, how they have been deployed and then a specific focus on one example of that, the installation at Test-Site, Brooklyn, which fits nicely within a theme running through the chapter concerning behaviour - in your case how the codes encourage what I term as both a cognitive and action-based behaviour. Let's discuss after I send it to you, you'll have a better sense of how I'm placing things then, and if anything is clearly wrong or I've misinterpreted something, then I'd be happy to address it. At the moment, until I've finished it, it's all a bit unclear so don't spend time thinking about it at the moment. Talk to you soon.

Sunday, 22 January 2017 at 19:57
Ebon: Oh, sure! No problem.

Sunday, 22 January 2017 at 20:00
Garrett: Great, just don't want to waste your time at the moment. I know your busy, and it's already very kind of you to offer to read it. Talk to you soon.

Appendix C

Gaia Tedone. 2016. *Discussion with curator Gaia Tedone about the framework of networked art*. Interviewed by Garrett Lynch. [video call] Skype 16/12/2016.

Gaia Tedone is an independent curator and researcher with an expansive interest in photography and the technologies and apparatuses of image formation. At the core of Gaia's current PhD research lies the question of how to reposition the role of the curator and the work of networked images within a contemporary image culture, where images act as data, computers perform the task of analytical tools and search engines are generators of meaning and aesthetic patterns. Her curatorial methodology is concerned with what is visible, and representable, and with the power structures informing images' availability, distribution and circulation across the networks.

Recently, Gaia acted as a guest curator for #exstrange, a project curated by Marialaura Ghidini and Rebekah Modrak on eBay, where she commissioned artworks-as-auctions and sold her curatorial consultancy service in partnership with Cassini, the eBay search algorithm. As a member of the artists-curators collective POIUYT, she co-produced for the 2017 edition of Unseen, Amsterdam, POIUYT RADIO — a YouTube live broadcasting dedicated to images-as-language, exploring the space between what is seen, heard and imagined.

Amongst the exhibitions she curated and co-curated: Point Zero. Critical practices in contemporary Italian photography, MLZ Art Dep, Trieste, 2017; Dispositifs d'occasion, Comédie de la Passerelle project, Paris, 2016; Shifting Gazes, Guest Projects, London, 2013. Foreclosed. Between Crisis and Possibility, The Kitchen, New York, 2011.

Garrett: As a whole did you understand the framework as it was explained?

Gaia: Well I have a good time with it I must admit. It's been a slow process of getting into it, but it really helped to read the text I must admit. Although the visual is very effective, it's just to grasp the complexity of the whole thing was quite important to also go through the written articulation. Somehow I almost felt I wanted to have the two things always, all the time, simultaneously integrated. Sometimes it almost when you read the text, which I think it's brilliant, it's quite dense as you had anticipated, and sometimes you get a bit, although its very clearly written, because it's dense, you use terms in specific ways and they have a specific meaning you do get a bit lost in some passages because you don't remember exactly. So like as a reader you almost want to have a glossary on one side, although you do

make your references pretty clearly, but it almost feels like you want to have like a glossary or the visual diagram running on one side and text on the other. I also did think that the way you constructed the texts also work in its own a little bit. It's crafted in a similar way, the writing, it's crafted in a similar way as your thinking.

Garrett: Were there any particular passages or explanations that you felt were unclear?

Gaia: There are points in the text where I did make notes that I was getting lost so if you want I can tell you which ones they are or the things I liked or just go through my comments basically. OK let's see. Well, the first thing I really liked was the networked perspective of practice, which I think is really key. I really thought what was really important was the distinction between networks as a real and virtual, the concrete system and how you position network art as a concrete system, it is a strong point I think, and it does come across quite importantly in this text.

I was curious, more on a selfish side about the distinction you make between play and development, we are on page 10, versus interpretation — like “the artist as user and the artist as observer are less about interpreting the work and more as kind of player development within the context of the work”. I thought that was really interesting from a curatorial perspective. Also, towards the end of the section, I liked this radical rethinking of the notion of hierarchy you put forward in terms of, it's the last paragraph of page 14.

OK … We are on page 18, the role of the artist as a context enabler/framework programmer and the merged role of artist and curator — of course, that's very interesting to me, and it picked up on previous conversations we had so I thought it was good to see it in the text. An interesting concept to me was this idea of network, page 19, the kind of evolution of networks as visual, from visual to functional. I thought it was an interesting sort of evolution or distinction to articulate.

Then when we move more into the mechanics of the framework, we are on page 23, I think that when we get to the horizontal plane, bottom/horizontal plane, those passages were, both in the animation and in the text I found more difficult to follow. There is a concept that implies movement of some sort, I think, visually although I do see them in the animation and in the rendition within the printed work maybe it could be, it doesn't stand out, I don't really grasp it I have to say and I do think that in a way in the animation when there is the movement its better, but I think also conceptually — let me reread it one second. Yes, there was a point where I got stuck in both occasion in a way so this idea of the dimension of those planes that might also be a limit for myself, I don't think in 3D.

Another aspect in the following page, this idea of the method for the viewer line of sight is time; the other sentence was a bit unclear to me, those four agents, I kind of got a bit lost in that passage that starts with according to.

Garrett: Which line number is this?

Gaia: 680 to 683 basically. I imagine it's so difficult to write clearly about this kind of … Yes anyway, that was a moment when I got a little bit lost. Then, while I think it's really nice to have all these examples of where you draw your sources in terms of diagrams, I enjoyed that.

Let me see if there was something else — oh yes there was the idea of the issue of authorship, the relation to the role of the artist, the observer and the user, which was interesting. I have a note that says “This distinction is important, but I do not fully follow it” and we are on page 39, line 1016 to 1022. I think the distinction between, the crucial difference between arrangement and behaviour and participation/interaction/relationality in prior art forms — I think I didn't understand Lister's quote the value-added characteristics. You have read the Open Work by Eco, Umberto Eco — I think it's called the Open Work.

Let me see if there were any other points that were unclear. No in terms of being unclear I think those passage were the most obscure, the other things I appreciated, the kind of discussion around the diagram through Latour towards the end I thought was really interesting.

…

Garrett: Do you feel I need to refer to the animated/interactive diagram from the text?

Gaia: Yes maybe this is something you can bring in the text I don't know if that's, you know academic, enough. You might even think of incorporating in the text a kind of signal to do that; I don't know if this is something you would consider or would feel the academic style. Maybe not.

Garrett: From a curatorial/educational perspective does the framework help to classify a practice in a way that is useful for you? The aim here is to present the practice in a way that accounts for its transdisciplinary nature, that is not reliant on descriptions that are based on medium and that frames the practice from the same perspective through which it is conceived.

Gaia: I really perceived it as a theorisation of a set of practice in this current moment under a different angle. So it was an interesting way to look at how things are actually operating, but within a specific kind of language, within a specific kind of angle that was quite, I thought it was quite consistent throughout. It's quite specific in a way, but also it's quite general, I mean it has this quite open, and it's quite … I mean it did feel like a big proposition in a way and also in the genealogy you kind of frame it with Stephen Willats, the lineage of conceptual art, I see where it comes from, I understood the kind of lineage. I do think you quite well make an effort to describe it, present it as a practical, useful proposition in a way, so it does have a thick conceptual aspect but it's also quite grounded in tendencies that are occurring at the moment, current mode we can experience, we do experience, art now.

I think the only aspect is that it's a lot of information to take in, so I found myself at times just struggling to remember all the nuances. I kind of get the general concept, but it's almost like each word has a specific take. You revisit it, you give it a different twist, so there is a complexity to it that I think needs to be there but at times … That's why sometimes I feel the writing is also another meta-language of your practice because it did feel also the way you were constructing the text was really very layered and sometimes when you have this proposition to a reader or someone it's difficult to get the full picture all the time in your head because you try to follow passages but I also think some of it is the academic writing.

I think it's a proposition that is useful; it's very conceptual, it's very conceptually driven in your understanding of, not conceptual as a conceptual artist, there is a lot of folding and folding on itself the way you describe it. It makes perfect sense in your practice, but sometimes it goes a bit overcomplicating or too complex.

Garrett: Are there any scenarios of what could be defined as a networked artwork that you feel could not be catered for by the framework?

Gaia: Well I think what I pointed out at the very beginning which is the strength of the argument as well although have a very detailed explanation of the operation of the framework is, what comes across as very strongly is this networked perspective on art practice so in a way that is a proposition that curatorially speaking is very interesting and potentially very inclusive. If that is one of the dominant concepts I retain, there is no example that immediately comes to mind that well let's see that no it doesn't work. So maybe in a way that is something that could even be stressed again towards the end of the text maybe.

…

Garrett: Where do you see issues with the framework, conceptual gaps that are not addressed or contradictory?

Gaia: I think the point observer user the collapse of that into the same term. There was a moment where I had to go back into that distinction to refresh it in my mind and remind myself because you use that as opposed to audience right, in terms of a kind of pacificity for the audience and this kind of integrated concept of observer–user as a kind of alternative. I think it is clear in my head, but there were points that I just had to go back and re-grasp exactly that notion somehow.

I think it's all connected to what I've seen, what I told you earlier there is a great deal of consistency but its like since it's so multi-layered sometimes you kind of have to track back to previous steps to really follow, but this is more into the text than the general framework I think. If one follows the animation for instance which is quicker and it's shorter, you follow more clearly also that. In the text maybe there is a sense that you almost want to … but again I haven't read the previous chapters. Did you spend a lot of time talking about the user observer aspects?

Garrett: In chapter 3, two of the sections, chapter 3.3 and 3.4 about new media art and relational art discuss interaction or relationality in some depth. The other two sections also touch on it in various ways, so it's a reoccurring topic throughout the chapter.

Gaia: Yes OK so that gives a better context. Again I just feel sometimes you want to have those refreshed. Although I do see that you try to do it most of the time but since you are almost creating a new vocabulary for networked art, cognitive versus non-cognitive, observer versus user, every time there is a word which is within each of the terms you are describing so sometimes it's just it's really a new vocabulary. Again we are back to the idea of the glossary.

Garrett: I am intending to employ a glossary at the back of the thesis. However, I'm concerned about having to move back and forth, from page to page that is, and how that may make it even more difficult to keep track of where the reader is reading.

Gaia: That could be a solution. I mean if this was not a PhD thesis but an artist's book you could insert at the beginning of each chapter a small booklet but of course this is not something you can do in this context but maybe what you just described, I don't know how the others are structured, but maybe you can do a first page at the beginning of each chapter

where the terms that are really key. You put the glossary in the text as the first thing that you read about that chapter maybe explaining why you are doing that or you do so that people can refer back to that first page if they get lost, or you do it at the end as you said. I think it also depends on the academic standards and what is allowed, flexibility with format and stuff. Do the terms evolve in their definition?

Garrett: The definitions are developed, not changed but discussed in progressively more detail and so are complexified.

Gaia: Well you know, it might be quite nice, maybe I'm talking more from the perspective of a curator who is thinking of an artist's book than a PhD thesis so take it with a pinch of salt, but it's almost nice to track down that evolution chapter to chapter.

Garrett: One thought was to employ something similar a publication called The New Media Reader where they place definitions in the margins of the pages directly alongside where the term occurs. These are sort of hyperlinks in print that allow the reader to look up a definition quickly. This would allow me to keep the flow of reading going but also create a sort of map in the margins of terms as they are introduced and developed. Do you know this publication?

Gaia: Let me see, The New Media Reader, who is the author?

Garrett: Noah Wardrip-Fruin and Nick Montfort.

Gaia: No I don't know it. … I think there is an argument to be made that should emphasise ease for the reader of the thesis, in your own interest, in everyone's interest basically.

Garrett: Are there any other aspects of the framework that we have not covered that you wish to draw attention to or discuss?

Gaia: No I think we covered quite a lot. I'm just thinking. The more we talk, the more things come up so if there are other areas … What are your own critical points, are there any specific other critical points or concerns you have yourself in relation to this?

Garrett: I'm principally concerned about the complexity of the explanation of the framework, I want it to be clear.

Gaia: Maybe I'm just curious to hear more about the language in your work. Did it resonate what I said in terms of the way I perceived also the writing in a way was part of the practice?

Garrett: In a sense, you're completely correct the framework is part of my practice. For example, I've purposefully written at length about diagrams and how the research considers their function as aligned with Deleuze and Guattari's concept of diagrams as plans or maps. The conception of the framework has employed diagrams to plan the framework, and it's now explained in the thesis through the use of diagrams. So the framework and its diagrams are inseparable.

In turn, the framework has informed practice during the research. It's been used as a way of planning the initial concepts and opportunities available. However, the framework emerges out of my practice, out of thinking about how I have structured it in the past as well as the observation of the practice of others. So the framework, informed by practice, is a diagram as a plan but additionally it's also a network and is diagrammed as such, and of course, this fits within the wider discussion that originates in chapter 1 of networks having visual origins. The type of art I'm practising and proposing is itself also a network. So as an artist who creates networks, creating the framework can ultimately be considered as creating an artwork.

I don't explicitly state this last point in the thesis, however. I don't feel it's necessary because what I'm attempting do is merge theory and practice, fold them into each other where they become one and the same. It's possible to think about and articulate the framework in this way, when it's not possible for example to do the same with writing and presented practice because the writing needs to, as you mentioned, conform to doctoral and academic standards and the practice expectations of galleries, exhibitions, festivals, where the practice might be placed as well as the observer–users that would behave with them.

Gaia: Do you have in the thesis a place where you position yourself as … Yes just I would be curious how you frame your position, you have framed or are going to frame your position because it's like you are the researcher, the artist, one of the case studies and also proposing something which is quite, almost an art historian, in a way. So I'm curious how you intend to single out those elements.

Garrett: My position is as artist researcher, and I will mention this in the introduction to the thesis.

Gaia: Yes I understand so this is a conceptual piece of art, the whole thing no?

Garrett: Again yes it can be considered as practice. As I mentioned the framework emerges out of my own practice and the observation of the practice of others, but it's important that it

also functions as research and networked art can be used as a means of classifying and understanding a type of practice.

…

Garrett: Thank you very much for taking the time to read the chapter and for this discussion, which has been very useful.

Appendix D

Josephine Bosma. 2017. *Discussion with art critic and theorist Josephine Bosma about the framework of networked art.* Interviewed by Garrett Lynch. [video call] Google Hangouts 03/10/2017.

Josephine Bosma is an art critic and theorist based in Amsterdam specialised in art in the context of the internet. She is the author of *Nettitudes - Let's Talk Net Art* (2011), co-editor of *ReadMe, the nettime reader* (1999) and has published numerous articles in magazines, books and catalogues.

Garrett: The research I'm doing for my thesis is I'm developing a framework. The framework is principally for me and my practice so that I can understand my practice and continue to develop my practice. However, it's equally a way of me understanding where my practice sits in relation to other practitioners and to understand their practice because they don't necessarily all identify themselves as part of the same movement or the same style or anything like that. The framework I'm proposing is not a movement, it's just a way of communicating an understanding, so this is why I said to you in the chat that the networked art that I'm talking about, the name isn't hugely important. The only reason I've chosen networked art is because network is a way of identifying a commonality across all of these people's practice. There is a clear idea of them working with ideas of connection and linking and so forth. But also I wanted to distance myself from previous discussions of network related art, things like internet art and net art, all those iterations because what I'm trying to do is talk about an art that's broader, a little more inclusive than art that's on the internet and I want to move forward from that. It does not exclude that art by any means, it's accepting of that art. Is this OK?

Josephine: Yes.

Garrett: You are shaking your head.

Josephine: Yes because you say some things that I absolutely don't agree with, so that's why I'm shaking my head. I mean I've been spending more, oh the last ten, twenty, well at least ten years trying to fight this idea that net art is something that happens online or that happens only within a certain movement. That it's actually very broad, that post-internet art is coming from a misunderstanding of net art really.

Garrett: I agree.

Josephine: And I think also that the use of the word network art doesn't really distance yourself. I mean even if I were to put myself in the shoes of somebody who is a bit more conservative than me in terms of net art and says that net art is something that only happens online and within a certain framework, even they would say network art sounds very much more like that. So I think that for you maybe it's helpful, but I don't think that in general, you would accomplish any distance from net art or internet art or all the discussion around these.

Garrett: I'm sorry I'm trying to understand your perspective because I've read a couple of things that you've written, the most recent being the article that's on your website which is Post Digital is Post Screen and from what I understood your position was exactly as you said, that you were trying to do this idea of art that's rooted or based in internet cultures but is also more inclusive than just art that's being talked about on the internet. Is that …

Josephine: Yes

Garrett: That's correct?

Josephine: Yes because internet cultures don't have to be on the internet.

Garrett: Yes so it's about that art trickling out into surrounding spaces.

Josephine: For me net art is a sort of transitory phase between, well it's a sort of emerging phase of contemporary arts having to face technology, having to face discussions that media art has been having for decades now because technologies have become so pervasive into all artists critical curatorial practices. Everybody uses these technologies now, and in some way or another, it affects practices of contemporary art that have tried to steer clear from technology and technological debates. So there is a clear overlap now, and it keeps on growing.

Garrett: Sure. I'm a little confused as to why you are saying you disagree because I actually see or I understand from what you are saying and from what I am saying that actually, we are talking about almost the same thing …

Josephine: Yes exactly, exactly yes …

Garrett: But that I'm coming at it from a different angle, which is from within practice, that is

doing it and looking at it as a means of developing my practice.

Josephine: Yes but I'm just saying it's just my opinion that when it comes to the term network art that you use I don't think, maybe others will disagree with me, but I don't think that you totally distance yourself from discussions and discourses that are happening around net art and post-internet art when you read that term. It's just impossible.

Garrett: Sure. I'm not saying that I'm totally trying to distance myself. Within my thesis I've talked about four different developments, sort of precursors to what I'm proposing and one of them is net art. So I'm not …

Josephine: And the other three, what are the other three?

Garrett: The other three, I talk about cybernetic art, then I talk about relational aesthetics …

Josephine: Mmm problematic one but yes.

Garrett: Problematic but for the argument I'm developing it's quite relevant. And the third one is net art, or rather new media art, I talk about net art within new media art, I specifically talk about a net artist, so it's really net art I'm talking about.

Josephine: Mmm what are your questions? Let's just do the questions. I don't think you really need to explain something else to me.

Garrett: OK, so I'm constructing a framework, I'm terming it networked art. The term isn't terribly important. The purpose is to contextualise my own practice as I said and the work of others and I'm trying to structure a practice, so it's loosely structuralist in a sense what I'm developing, in order to create an understanding of the practice but without dictating a restrictive methodology, style, format or platform. It's trying to be quite open in terms of what it does so that it can be used and applied very practically. Very important to say as well that the framework is emerging out of existing practice I'm not writing a framework and then forcing artists into that, it's based on observation and my own experience.

The second purpose of the framework is that it's to communicate to others so in an art historical sense and an educational sense, used as a method to explain what is this practice, what does it do, how does the practitioner create work in this practice, what are the commonalities that run across both the practitioners practice and other practitioners practice. So in a sense its targeted at the audience, curators, art historians, writers and so forth. That's

the point of me interviewing the experts, one of which is you, to assess whether the framework is sensible. It's not so much a discussion around the networked art per se or the terminology, it's really to assess whether from a curators perspective or a critic's perspective this is a framework they feel is useful, that it does something that perhaps hasn't been done before or if there are problems to identify what those problems are and how maybe they might be addressed.

So the diagram you have looked at is very tied in with the framework. In fact, I make an argument within the thesis that this diagram is actually the framework, that because it emerges out of practice and because I suppose loosely said I could be classified as a visual artist, very basically, fundamentally or initially, my way of thinking tends to be visual, so I've constructed the framework visually before I wrote about it and essentially this diagram is the framework. The four points that you can see in the diagram, the artist is the person who creates the work, the observer–user is discussed under interaction because I'm talking about user within new media art and so forth but also the history of what tails into user to do with participation, observation, Psychical Distance, all of those things and how the two dovetail …

Josephine: I understand all these things but we are already ten minutes on the way, and I've already studied that framework part …

Garrett: OK.

Josephine: So just shoot your questions at me. I also made some notes with every step of that so I …

Garrett: OK so you understand. Great, I just wanted to be sure that you understood.

Josephine: Yes.

Garrett: The first thing I wanted to ask you was basically that, did you understand the framework and its purpose and if not …

Josephine: It's purpose not so much no. The framework that you develop, I don't really understand because in the, was it in the letter that you sent me, somewhere you said that this was to create a framework for others to works from. You say that you don't want to push people into it, but it does sound quite ambitious, and so my question is what is your ambition? What do you want to do?

Garrett: The framework is mainly for me for working from, the practitioners I'm talking about in the thesis, they, apart from one, don't know about this framework. They are already conforming to what the framework is because as I said the framework is based on observing their practice, so there's no point where I'm showing the framework to these artists and them then trying to fit into it. They are already doing it.

Josephine: So you have four case studies basically?

Garrett: No I have six case studies and myself.

Josephine: OK, so …

Garrett: So you understand the framework, but you're not clear on the …

Josephine: What exactly do you want to do with it is not clear, is still not clear for me.

Garrett: OK so shall I …

Josephine: How would that framework be useful for a critic or curator?

Garrett: From a critic, curator or historian's point of view the purpose of the framework is to frame an understanding of a type of practice so that understanding can be communicated to others. For example in a curatorial context, the framework could be used to form statements about an exhibition, to frame the practice of the artist within the exhibition. Within an education context, it could be …

Josephine: Frame how, frame for what, within what?

Garrett: To communicate what these artists are doing, what their methodologies are, what their practice is, what they have in common.

Josephine: OK let's just move on. Maybe then we'll get deeper into it, and maybe I can understand better what it is you are trying to do. OK?

Garrett: OK. The questions are going to build along the same lines about the framework, but I'll move on. From your perspective as art critic, the second question was, does the framework help to classify a practice that you feel is useful and do you think an audience would find it useful, for example, does it provide insight into the artist's methodologies?

Josephine: I'm going to be very unpleasant and say no because the framework is so, it has such a rigid structure, it's not meant to be, but it does. The shape itself so regularly, it has a very rigid structure and also the way you place works that I think I know within it. You talk about hierarchies, which are not always there, you talk about the audience, how did you call it, observer–users, I don't like the word user, it's hard to avoid these days, but I don't like it at all and I think that in the network art practices that I have followed observers, users, audience members are often participants, collaborators, they are much more than observers and users.

Garrett: I agree.

Josephine: So that's why I feel this rigid structure is too rigid for what you are trying to frame. That's where my discomfort comes from.

Garrett: OK, keep in mind that you have only seen the diagram, you have not read any of the thesis. The thesis goes into the depth on …

Josephine: But you are asking me about the diagram of the framework.

Garrett: Sure, I am but as I said you don't have the depth because of the time constraints. There are discussions in the thesis that explain precisely what I mean by user and observer. I do acknowledge all the aspects of participant and so forth, so even though it seems on the surface, they might be restrictive terms those have to be short terms when they are put into a diagram. That's the limitation of a diagram; it has to be compact and succinct.

Josephine: Well I suggest you change the word user to something more active so that you have on that node observer, which is very passive, and something much more active next to it, which shows more the width, breadth or scope of the kind of people we are talking about.

Garrett: OK. So this is good, I know you think that this is very bad or very negative, but actually, this is good because I'm looking for where you see there are potential issues.

User as a problematic term has come up in my research as well, and there are compromises when you look at all these terms. I know, for example, user is not even favoured by Don Norman anymore. He has moved on to other terms, so it's after a long debate that I settled on user because it builds on a history of what has gone in the past, people can understand it, so it forms an access point to understanding what I'm trying to communicate. I could have gone with other terms but to hear from somebody who is an art critic and theorist that it is still

a problematic term, that's useful, and I can feed that back into the thesis.

On the tail end of that question, about providing insight into artist's methodologies, do you feel it provides any insight into artist's methodologies?

Josephine: Yes what I find interesting about it, let me give you a positive note, is that what I find problematic in some approaches of net art, network art or interactive art, new media art, whatever you want to call it, is that there are two prejudices about it. The first is that the author does not exist anymore so that this work belongs to everybody. That's the wrong approach. So what your framework makes very clear is that there is an initiator. For me, that is the most important part, that there is a sort of point where it starts.

Then the other prejudice is that the artist leaves the audience completely free, leaves anybody completely free to do whatever they want with the work. I actually wrote a text once called Musaic about sound art and new technologies in which I explained that this is not so, that every interactive work is a sort of cage, it has its limitations and I got a very negative response to that from somebody, some reviewer, who called me a fascist because I said that. An interactive artwork is actually a means where artists, in a sort of sneaky way, keep control of situations or create a situation and sets clear limitations.

Garrett: I absolutely agree with you. I've spoken about those two aspects within the thesis, the artist as what I've called the point of origin, so it's capturing that idea you just said that there is a beginning point but also acknowledging then that once it moves beyond them that there is, in some scenarios the possibility to change the work and observer–users become authors. But also talking about that idea that the artist constructs what is called a framework, which comes from programming, that there is a framework for everything, a set of parameters and you work within those parameters. That exists within all the art I'm talking about — it's impossible to say that these works are completely open. They are not.

Josephine: Do you speak of intent at all?

Garrett: Yes I do. Intent from both the artist's and the observer–user's point of view.

Josephine: I mention it because some artists, even though they cannot completely escape the fact that they are initiators and set some sort of framework, they do have the intent to completely set the work free, have no authorship and let the audience do whatever they want. There are quite a few examples. Those people will not be happy with your hierarchical order as well.

Garrett: Well interestingly I can think of one who might conform to that, which is Ebon Fisher, do you know of Ebon Fisher?

Josephine: Yes. Also, how about Heath Bunting?

Garrett: I know Heath Bunting yes, I've not written about Heath Bunting but I've written about Ebon, and I think he conforms to that ideal of wanting to set the artwork completely free, but I think from what we have discussed he recognises that it's an ideal that he's ever aspiring to. I don't think I've seen any artwork that is completely open.

Josephine: Well it's like with abstraction. If you make abstract works, you can say there is very little of the author in there, but even in Malevich's red square, there is always this … friction.

Garrett: Yes there is always something, that initial point of origin. I couldn't agree more.

So I'll move onto the third question. I'm thinking now about the scenarios of and different types of networked art that this might be trying to capture or encompass, keeping in mind that the framework is attempting to be very open. From your perspective can you think of any scenarios, any artworks, that might be defined as networked art or net art but could not be catered for by this framework?

Josephine: Let me look at my notes. Well, you are putting me on the spot to come up with a work. Let me just go deeper into some criticism. For example, another point I wanted you to clarify was what are artwork elements? You speak of cognition as if artwork elements could not have cognition. Artwork elements can be all sorts of things, they can be systems, people, thinking machines, dead or living matter so that could also be a problem for the framework.

Garrett: The artwork element is anything that is non-cognitive within the framework. If it incorporates something that is cognitive like the observer–user or the artist then there wouldn't be those three points, they would collapse.

Josephine: A social sculpture will not fit in your framework.

Garrett: What do you mean by a social sculpture?

Josephine: For instance Mark Tribe, he is an artist, he started Rhizome as an artwork, he

says it was an artwork in the very beginning. He called it a social sculpture so that would not fit into the framework.

Garrett: I don't see how it wouldn't fit into the framework because it has the artist, it has us as the observer–users, and it has the artwork element, which would be the site itself, not the people within it but just the actual HTML, the images and so forth.

Josephine: Then you are saying that the participants are not artwork elements. They are so important in it. For instance, if somebody uses a system or an artificial intelligence, where do you draw the line of cognition?

Garrett: At the moment the distinction between artwork element and observer–user is cognition, and the basis I'm using for that is cybernetics and systems theory. I do say in the thesis that yes the framework becomes problematic once artificial intelligence comes along. That something then needs to happen to the framework, but we have not got to that stage yet. So the framework is thinking up until that point and then needs to be modified for after that point.

Josephine: Well … and then there is the internodal space and the space of culture that you mention on the last slide. I also think they permeate each other.

Garrett: Yes they do. The internodal space is within the space of culture because artworks exist within culture and artworks contribute to new artworks, they inform artworks, artists inspire other artists and so forth and there are further developments and so forth so yes they do permeate or fold into each other. That's all stated in the thesis.

Josephine: You also mention how different nodes can be part of other networks as well and one thing to keep in mind, and maybe you also have that in your thesis, is that each of your nodes that you speak about, it seems to imply that there is only four elements to the work whereas there can be many more because every node can be multiple nodes right?

Garrett: Correct and it does refer to this in the thesis by referring to each of the nodes as singular and plural. What you see in the diagram is the generalised and simplest version of the framework. In reality, it would never be this simple; it would be massively more complex.

Josephine: Exactly.

Garrett: But obviously to communicate it I need to visualise one simple core element and

then talk about how it gets complexified. Yes, you are absolutely correct in that what we would see would be many observer–users, many artwork elements, possibly many artists and of course all folding into each other, all affecting other artworks within culture. So yes they fold together very complexly.

Josephine: So I will think about what you asked me — if I know of a work that doesn't follow it. I can't give you one right now.

Garrett: OK so the next question. Do you see any issues, we have covered a little of this, but perhaps you want to add more, with the framework, for example, any conceptual gaps that are not addressed or contradictory?

Josephine: Well I've mentioned some things to you, but again I haven't read your thesis. Sometimes small things can really be consequential. There was one other thing that I haven't mentioned yet. It's not like I disagree completely with every element of your framework but I wasn't sure whether having to think before acting was always necessary. There is always spontaneity, there is always reflex, so that's just one minor thing that I thought about, which was in your fifth slide that this came up, that the audience or the observer–user has to think before responding, before acting or before doing anything. Do you know what I mean?

Garrett: I'm just looking at it.

Josephine: That's the fifth slide in that slideshow you made, and in that, you say the observer–user has to think before doing anything.

Garrett: Yes I see what you mean.

Josephine: I was wondering if that was completely true.

Garrett: I think that's a very good point. What I was trying to get across was that all actions have a basis in some sort of thought, whether the thought is simply a motor movement, trigger my hand to move, or whether it's a more detailed thought. I think you're right I need to tease that out a little more so that it's a bit more specific and says that it could be a very simplified thought before the action, so that doesn't exclude spontaneity effectively. That's a good point, thank you.

OK, next question. One of the things that's very important in the framework, and I've explained this at the start, is the relationship between the text that I've written and the

diagram. I've explained in the thesis that the diagrams of the framework are in fact, they are not visualisations, but they are the framework because they emerge out of practice. Fundamentally I'm a visual artist, so they effectively function as what Deleuze and Guattari call plans or maps for action, that you have this diagram, but it's not diagramming a thing that exists it's a map to doing something and to producing. I'm thinking about the framework in the same way that this exists and it's a way of thinking about how can I now think about my practice from here on in. Even though it has come out of practice how can I now start to mould my practice so that it becomes more unified, more consistent and ultimately easier to communicate. Thinking about the diagram very specifically, I know all of your understanding of the framework has come from the diagram, so this may be a slight repetition, are there any aspects of the diagram that you felt you did not understand as they are explained within that visual? Is there anything additional that you feel is unclear, stands out, needs modification, anything like that?

Josephine: Well I think I have said everything.

Garrett: OK, the last question is an open question to see if there was anything else you wanted to raise, anything else you felt was necessary to say?

Josephine: Except for good luck with your PhD, no.

Garrett: That's absolutely fine.

Appendix E

Francis Halsall. 2017. *Discussion with academic and art theorist Dr Francis Halsall about the framework of networked art.* Interviewed by Garrett Lynch. [video call] Google Hangouts 19/10/2017.

Francis Halsall is a lecturer and art theorist based in Dublin specialised in the history, theory and practice of modern and contemporary art with a particular focus on philosophical aesthetics and the cultural reception of systems theories. He is the author of *Systems of Art: Art, History and Systems Theory* (2008), co-editor of *Critical Communities and Aesthetic Practices* (2012) and *Rediscovering aesthetics: transdisciplinary voices from art history, philosophy, and art practice* (2009).

Garrett: Have you had a chance to have a look at the animated framework I sent you?

Francis: I did yes, I looked at it this afternoon. I looked at it quite quickly, I spent about half an hour on it, and I'm not sure if I understood it all. It may be that I'm rushing between teaching and I didn't spend enough time on it. I thought it was really interesting as an initial prospect, but I didn't quite understand when it moved from the animation into the interactive one. I think I didn't understand all the parameters you were setting and the use of space, why for example there would be a difference between a triangulation, the triangulation made sense to me but then I didn't understand the plane idea. I didn't know how literally you were applying this. You said you were using a kind of Deleuzian vision of a diagram. I didn't know whether you were metaphorically using this or whether you were using this as a diagnostic apparatus.

Garrett: What I will do is bring it up on the screen for you so we can refer to it as we are talking about it. OK, so you should be able to see it there in front of you.

The purpose of the framework is twofold. I'm a practising artist, so this is me theorising my practice and trying to understand a way to move my practice forward. Much of it comes out of a post net art way of thinking, and I don't want to sort of fall into these ideas of post-internet art and post media art because I think they are dead ends. So I'm trying to think about networks in wider contexts than the internet so that I can start practising in ways that are essentially thinking about ideas of connectedness and linking but that doesn't necessarily refer back to the internet. In a way I suppose the easiest analogue to this would be relational aesthetics, that is a little of what I am trying to capture in that this kind of artist is going out

into the wider world and are talking about relations between things in a much wider context. But I'm also trying to retain a little of the understanding that has happened within systems art, with Hans Haacke and Burnham and also new media art and net art and so forth without disposing of anything that has happened within those. So a recognition of history that relational aesthetics doesn't really do a lot of.

In the second case, the point of the framework, and this is why I have visualised the framework — why it's this sort of online interface that you can animate, move around and click on things, I'm trying to communicate my idea to others such as yourself, what I'm calling the experts of the kind of art that I'm dealing with so that ultimately the type of art I'm producing will be understood. That there is this means of referring back to something that says this is effectively the methodology of the artist or hopefully if other artists start adopting it that it's the methodology of a group of artists, this is what they have in common so that there is not this reference to anything like style or medium or form or anything like that. It's this framework, this manner of working is essentially what connects these artists.

Francis: OK that's actually really helpful. One of the things that took a little time was the specificity. In the absence of a specificity, it's very abstract, and that's not a bad thing. I was trying to imagine what you were talking about and then I was looking at the website as well, again I did this quickly I spent about an hour on this, so it probably wasn't enough time for me to think myself into it.

One thing that occurred to me whilst I was looking at it, and actually the way you have described it which was helpful, from a Luhmann perspective let's say or a particular type of systems theoretical position basically that diagram covers all art. When you are talking about style, medium and form being replaced by a framework one consistent account of art where you get this triangulation between the artist, the observer and behaviour — from one systems perspective that's all art, that's a description of all art, that's Luhmann's description of the medium of art. It's interesting you say you relate that to the relational paradigm, which I guess you're talking about Bourriaud, but you could also argue that all art is relational, which I've also argued elsewhere. I'm certainly very interested in the relationship between the relational paradigm and the systems paradigm, so it's really interesting to hear you say that.

Garrett: I'm, I suppose the word is impressed, very impressed that you have picked up on that aspect very quickly by looking at the diagram and that you've not had to read a chapter to figure out that this could fold back and be all art, that this captures all art. I see that as both a weakness and a strength. It may be a weakness because it's so huge the framework effectively becomes nothing, that you can do nothing with it. However, I see it as a strength in

that it provides a means for something that is as specific as let's say net art, which is very much locked into platforms of browsers and so forth, that it allows a means for those to move beyond the internet and start to think in a way that is much more open and much more embracing of the world around them.

Francis: Yes, I've often been very frustrated about so-called new media art and network art that it gets very specifically coupled with a set of technologies. My scepticism of the Edward Shanken book, for example, I know I'm in that, you know the Whitechapel reader book?[118]

Garrett: Yes.

Francis: My scepticism around that is that it couples systems very specifically with a particular understanding of new media that emerges around the 1960s and I think that's too limiting. So I'm in sympathy with what you are saying because if I think you are going to take that idea very seriously the influence of particular forms of technology and particular metaphors for organisation and structure and so on would not be limited to that kind of technology, that they would have a broader cultural effect.

In a related point, I made this argument elsewhere as well, if this does apply to all art, and I think it does, that definition or that application of it applying to all art still has the specificity of being a network or systems thinking, so it emerges at a particular moment against a horizon of systems thinking and so on. Secondly, that it could be applied as a retrospective discourse, I also have sympathy with that. Basically, as technology changes so too does our understand of art, but that different understanding of art can go back because we are looking back at the past from our own particular critical perspective. So I think I'm agreeing with you to cover all art from a perspective I don't see as a problem.

Garrett: It very much depends on your perspective really. If you are trying to encapsulate something neatly that might be, and this is not by any means trying to be a movement or anything like that or a group of artist's as net art has tried to be, if you are trying to do that and you are trying to explain that group of artists then this framework becomes perhaps a little difficult because it's difficult to separate them out from other artists. I've got case studies in my thesis where I'm talking about artists who are quite different in terms of the medium they are using, but they have this idea of a connectedness shared across them. When you compare it to earlier chapters that I've written, and I've written quite a lot about Hans Haacke in one of the earlier chapters within the context of Burnham, you can very easily say, well

118 Systems (Whitechapel: Documents of Contemporary Art).

hang on a minute what you have said here about these contemporary artists you can equally apply to Burnham's. But that is kind of the point of what I've been writing about.

Francis: Again I'm very sympathetic toward that. You're saying that this particular methodology means that there can't be an identification or a particular type of practices within a broader field, I don't see that as a problem. To identify them as being somehow similar is sort of second-guessing the points of similarity between them might be. The very spirit of a system, networked or relational paradigm means these traditional definitions of medium are going to be dissipated anyway so to talk about there being a medium of, you said net art, a medium of new media art is from my perspective inherently problematic anyway.

Garrett: When I started out writing this thesis I started thinking that the artist's I was writing about were transdisciplinary artists. Since then where I've actually ended up is that I've now thought that, while even though I'm trying to avoid this idea of post, post-internet, postmodern and post-media because they are inherently problematic, I think that this is actually post-disciplinary. That the artists I'm talking about, they are not thinking about mediums anymore they are thinking about these shared concepts, and they are not thinking, I'm not sure if you know this book, You're Everyday Art World, do you know this?

Francis: Yes, in fact, I was in, when was it two years ago when I was in Cranbrook, so I was visiting fellow three years ago, and I did a following visit the year after, Lane was acting head of sculpture when I was there.

Garrett: A very interesting book.

Francis: Yes he talks about systems there. He's a really interesting character because he started off, I think it says this in the introduction, kind of valorising these forms of DIY, fanzines and so on because he comes out of a background of music and DIY/fan culture and so on. So he moves from a position of valorising that and being deeply sceptical of it in the way it feeds into forms of neoliberal kind of entrepreneurship, and I like the ambivalence of that as well.

I organised a panel a couple of years ago, and he was on it talking about systems, DIY and so on and I've used him a lot in thinking about, again with a sense of deep ambivalence, thinking about the contemporary figure of the artist as being a cultural entrepreneur who uses platform rather than medium and will use whatever platform they have available for themselves in order to engage with networks of communication and control. I've often used Liam Gillick as being an exemplar artist of someone who does that, so he moves between

different platforms be they architecture or design or pedagogical or discursive and so on, but I don't know whether I like that stuff. It's just something that seems to, it reflects back those contemporary conditions of neoliberal entrepreneurship, artists become entrepreneurs. I'm not sure I like it.

Garrett: Sure. Liam Gillick is a particularly successful example because he obviously generates money and generates things like residencies, exhibitions and so forth, so he's able to jump platforms like that. The artist's I'm more seeing that I've been discussing are not quite as successful as he is, they are not jumping between platforms per se, from one exhibition space to one residency, moving across the world and so forth but they are jumping from different technologies to, you know something that is computer-based to something that is paint to something that is working with glass, sculpture — they are moving between what would traditionally be called mediums.

Francis: So what examples do you have then?

Garrett: Some of the artists I've discussed are Ebon Fisher, he's an American artist, he works with I suppose what you could loosely call memes, memes about networks effectively and having an impact in social spaces. Suzanne Treister …

Francis: These are new names to me.

Garrett: Suzanne Treister has an exhibition in London at the moment at IMT Gallery. She has a very traditional background, she is a painter but she I suppose is most famously known for painting and drawing visualisations of networks, particularly networks of power relations so how companies relate with each other …

Francis: Have you heard of Mark Lombardi?

Garrett: She's very much like Mark Lombardi, but her works are much more colourful.

Francis: Do you know these guys the Bureau … who also draw maps of … they are called the Bureau D'etude I think, the Bureau of Study and they again do very colourful visualisations of networks of power.

Garrett: It sounds vaguely familiar, but I don't know them very well no.

Francis: If I forget can you prompt me and I'll send you the link. I'm just going to see if I have

the book to hand. No, I don't actually.

Garrett: OK.

Francis: So to play devil's advocate then and this is something I put in the book, so it's an old idea to me now, if you're talking about the move beyond medium that's been around since the 1960s, since the move from modernist specificity. Krauss has already talked about it, Lippard has already talked about it, whereas you seem to be suggesting that there is a kind of newness to this or some kind of contemporaneity to this. What is that contemporaneity, is it to do with technology and if it is to do with technology are you not bringing back in then the thing you claim to be moving away from?

Garrett: Yes and no. The uniqueness of my thesis is that I'm bringing the framework to the table and saying this is a certain perspective on how I'm framing this type of work. For I suppose art in general what I'm trying to say is that the transitional period between systems art, which is really the timeline where I say this has sort of started but I actually do spend a chapter talking about systems prior to the twentieth century and building up an argument about how systems and networks were a kind of visual artefact that then took off in the twentieth century. The transition between systems in the 1960s through new media art, through Roy Ascott and net art, and all of that I feel is very important because I feel that even though networks are not all about computers, they have certainly contributed quite a lot to what networks are. We are not able to go back to that pre-computer era where we can just talk about networks outside of the context of computers; they do have to be informed in some shape by computers even if we are not dealing with them in the execution of a piece of work, it's still informed.

Francis: OK, again I'm in sympathy with that. The book I'm trying to finish at the moment is about a long history of systems, the argument of the book actually is that through a world of systems we get an alternative history of modernity and the use of systems as a metaphor emerging. You get it in Newton, and then from beyond there, it emerges as a literary genre as systems in the eighteenth century and so on, pre-computer again. But the emergence of social systems art in the 1960s, which emerges at a similar time to the move beyond the object and the post-medium condition and so forth, am I wrong in picking up on, you said you were talking about art in the last ten years or are you saying that the period that begins in the 1960s is a contemporary moment that continues to now?

Garrett: I haven't explicitly said it but I'm saying that the type of art I'm talking about could certainly extend back as far as the 1950s, that you could include people like Hans Haacke

within this quite easily, and that you could make an argument to go further back, but the examples I talk about in chapter 5 are all specifically within the last ten to fifteen years because I feel that computers have added something. Even though it may not be the medium let's say that they are working in, it may not have directly impacted their work or they may not be showing their work through it in some shape or form, there is an understanding of networks via computers in some shape or form.

Francis: That's helpful.

Garrett: I'll tell you how far back I go pre-twentieth century, I go back as far as, do you know the anthropologists Carter and Schuster I think they are called?

Francis: No.

Garrett: Let me just look up their name. It's Carl Schuster and Edmund Carpenter sorry, they have a book that's called Patterns that Connect.

Francis: Is it a contemporary book?

Garrett: It's a book from … the 1970s perhaps, something like that. They did a study of primitive cultures. So there is a link there on screen, which will go to a page that will show you some screenshots of what's in the book. They basically made an argument about what they call Y patterns in this book, the shape of a Y, and they talk about how the Y pattern is used in patterns on ceramics and in weaving and in the construction of huts, loads of things all across the globe through disjointed societies. A lot of it is talking about the community that tribe exist within, so it's about making relations between one person and their children and their children's children and so forth. So they are essentially visualising networks through these primitive art forms. When you read it with that idea of networks in mind it's very interesting, they don't ever explicitly talk about networks because it wasn't such a hot topic when they were writing this book, but with that frame of reference, it's really, really interesting.

Francis: I found this in thinking about systems as well, it becomes a kind of gargantuan if you like, it swallows everything if you think through the term system because it's a sort of totalising discourse, everything becomes a system. One thing I have a sort of nagging hunch about and I haven't yet fully developed it is that there is a different thing at stake in the metaphor of network and the metaphor of system, and I haven't quite worked out exactly what that is, but there seem to be different sensibilities in play.

I was just in Berlin two weeks ago at Humboldt University at a workshop I had to network through, and I'm a little hostile towards, sceptical I should say, towards network theory. I'm trying to work out why I'm a systems guy, and I'm not a network guy, and I don't know whether it's a very simple sensibility, one is Adidas, and one is Puma or something like that, you are either one or the other. Somebody at the workshop pointed out that actor-network theory, again which I haven't really worked on a lot, they take a situation and like to make it more complicated whereas a systems theorist, which is my perspective, what a systems theorist does is looks at a situation and tries to make it more simple. I wonder whether that's it, as I said actor-network theory looks at something complex to hand and says let's look at all the ways we can make this complicated and think about all the different connections going on whereas a systems theorist will try to look for isomorphisms shared and try to simplify something. I don't know, my sensibility about the whole thing is to try to think about how a different account of modernity would be through an attempt to systemise everything from education or law or the nation-state or forms of motor production etc. etc.

Garrett: I think part of the problem is that because we went through that period in the 1960s and 1970s where systems got a bad name for a while because it was associated all of a sudden with governments and strategies for war-making and so forth whereas networks haven't quite done that. Networks have been hyped, so networks in people's mind is the one that's linked with computers and perhaps that's what's making you feel slightly negative towards it.

Francis: It might be …

Garrett: But I also think Latour is not the be all and end all of networks, there are lots of other theories about networks out there, and his specific take on networks is very particular, very, very particular.

Francis: I do have a scepticism about actor-network theory …

Garrett: Yes I do too.

Francis: Yes it turns out loads of people do. I thought he was widely accepted but hanging out with these guys two weeks ago it turns out there is a lot of scepticism towards him even in French sociology for example, which I wasn't aware of.

Garrett: OK, so let's move back to the framework because I'm aware that time is moving on. So this so the first question …

Francis: Sorry.

Garrett: That's OK, that's perfectly OK, that was very interesting anyway.

The first question is, because you said at the start that there were parts of the diagram that you didn't fully understand, so shall we tease that out a little — what particular aspect of the diagram, don't worry too much about the interactive mode let's just stick with the animation, everything you saw on-screen, was there anything that didn't make sense?

Francis: I was trying to find the sort of hook for it. I didn't know to what it was specifically applying because of its abstraction, so it was actually helpful for you to then further clarify a bit. I didn't know whether you were referring to a specific type of art and if so what that art was or whether you were referring to art in general. Just hang on for a moment …

Garrett: OK.

Francis: Sorry about that.

Garrett: That's OK. Shall I maybe give you an example of a piece of work that I consider the framework would apply to?

Francis: Yes.

Garrett: OK, so I shall use perhaps one of my own. I did a piece of work recently where I worked with the free stuff community online, which is a group of people where they apply for offers for things, they do competitions, they go on Twitter and Facebook, and they try to get anything basically for free. Competitioners they would have been called back in the TV days. There is a whole community out there, whole websites dedicated to this.

I spent about a year and a half getting things for free from the internet. I made two websites. On the first website I documented everything that I got for free, I took screenshots of all the forms that I filled in online, all the emails that I sent and all that went up on the first website. Then when that part of the performance ended I took photographs of all the things I had accumulated, they all went into a second website, and I'm currently on the end stages of this work where I'm selling all the items back through the web through eBay to gather money. So the whole point of this was to make a performance and generate work from nothing, that during the middle of the project would be materialised and then at the end of the project

would go back towards a network — the network was generating everything, everything was passing through a network.

In the diagram of the framework, which I'll bring up again, you can see there is the artist, which is me. I am working with, in the first instance, observer–users who are effectively audience or anybody I interact with, so the companies that offer things for free. Then the artwork elements are the things that are accumulated as well as the web artefacts that I'm building, all the documentation, the databases and so forth. Then the behaviour is the performance that's occurring as a result of the other three things, that's emerging out of those three things. In the tail end of the performance the observer–user is more a traditional audience who would come to see the accumulated objects in an exhibition that I had, and it's also the people who buy the things through eBay. So it's basically about those four nodes, essentially that any work where you can think of these things interacting, any variations on that and how they fit into that framework that's how the framework is supposed to be explained. The observer–user, that's the term that most people are having problems with, comes from the traditional sciences using the idea of observation. That you are removed from what you observe, so it's meant to embody this idea of passiveness but conjoined with user it's supposed to embody the new idea post-cybernetics of well we are actually immersed in what we observe, we interact with it, we influence it.

Francis: What's that … I'm having difficulty reading …

Garrett: So effectively I'm trying to explain what the audience of today is for these works because they are both users of the works and observers of the works.

Francis: But what's the term, sorry?

Garrett: Observer–user.

Francis: No the one that's in the middle. Oh artwork element, OK.

Garrett: The artwork element is any, what I've called non-cognitive aspect of the artwork. An observer–user and the artist they are both cognitive, the artwork element are the remaining things, the artefacts, the digital artefacts, texts that are produced, all of that. The behaviour is the interaction in the performance, the occurrence of the event. Does that make sense?

Francis: Yes.

Garrett: OK so the first question is, the way I've explained the framework to you and what you have seen in the diagram, do you understand its purpose?

Francis: Yes I do, but I'm still struggling a little with this question around specificity. Why you need this to describe new contemporary forms of practice, but that fault might be on my side in that I'm still trying to think myself into it. So yes I do understand it.

Garrett: The main personal reason for this is because the way I practice is this manner that we have already talked about where I'm moving across platforms and moving across mediums so audiences looking at my work, a lot of the time they will look at it from a very traditional perspective, and they will say well you don't have a style, or you are not working with a particular form consistently and developing an idea within that form.

Francis: But do people really say that? I mean I would have thought that question of style and medium hasn't really been a true pertinent question since the 1960s.

Garrett: I think it depends on your audience. If you're the kind of audience who is going to buy work and put it up on your living room wall then you are very much that type of person where you are looking and following artists because of their style and their medium and that's still quite a substantial part of the art world that exists today. It's still locked into that object paradigm, which is connected with style. I think a much more informed audience, yes it's true they will understand that since the 1960s we have moved beyond that but it's also about a way of explaining why am I moving between these mediums, what is the advantage of doing that, what is the benefit for me, how does my work cohesively come together.

Francis: I got you.

Garrett: So from a personal point of view this is a way of rationalising that and allowing me to communicate, this is what I'm doing and how to move it forward essentially.

Francis: Have you read Joselit's After Art?

Garrett: I think I have a copy of it here waiting to be read.

Francis: It sounds like the way you describe it there that you are doing some things that he is talking about. He talks about format, replacing medium. I've often read him in relation to Lane, Lane talking about platform and Joselit talking about format.

This is a question for you then; I find that very interesting as a sort of intellectual project to try to find a different way of positioning your practice, to give you another framework, to use your word, that allows you to think about the specificity of certain practices interdependently of your work. Given that his book is called After Art, is there a problem in this model that actually by having the figure of the artist you are sort of reinscribing it back into a very traditional paradigm? So maybe you're not talking about specific medium, but the very figure of the artist is that not itself a very traditional figure, which is bound by notions of particular forms of expression and notions of creativity? As a question, should one of the things that are at stake in a framework such as this be that the figure of the artist needs to disappear because observer–user, artist and behaviour might all start to become conflated into one? Maybe, for example, the artwork element is a performative dimension in which case the behaviour becomes the thing that is looked at or is it maybe that the observer–user needs to be involved in the creative process of the quote-unquote artist?

Garrett: I had a very similar discussion with my second interviewee last week who was Josephine Bosma, she writes about art in the context of the internet, she is a Dutch critic and art theorist. She is the opposite, she is very keen that the artist was there because she said she felt that net art, in particular, had this idea that there is no artist anymore because the user interacts with an artwork and they change it, they become the artist themselves, so there is no distinction between the artist and the user. She feels that's complete nonsense because there is always the artist who initiates the work.

I agree with that absolutely. Even if you look back at conceptual art that tried to do that by completely removing medium there is always that initial idea; there is always the person or persons who think of that original idea. So my argument in the thesis is that OK yes you can have forms that are more democratising, that users become more involved and dramatically change the work but the role of the artist is essentially the one who initiates the thing that is then behaved with. It doesn't have to be the one who defines what it's going to look like or how it behaves, that can come later, but they are the initiator essentially.

Francis: I'd buy that. What I was asking was a rhetorical question …

Garrett: You're breaking up a little … right you are back now, can you repeat that last sentence? I didn't quite hear it.

Francis: In a model of art and an understanding of art you also have an understanding of subjectivity and the human subject, and an understanding of what the human subject is underwrites an understanding of what an artwork is. So in a Renaissance humanist model,

we have an understanding that art is about some articulation of shared values. In the expressive model of art, which is late nineteenth and early twentieth century, we have an idea that art is about individual self-expression. It's about the autonomous agent expressing themselves. Those are two very different, probably mutually exclusive, understandings of art that are being underwritten by a particular understanding of what the human subject may be. One participating in some sort of shared collective reason whilst the other is individualistic and self-expressive. So in a networked understanding of art, the artist and the artwork is something that is distributed within a series of networks of communication …

Garrett: You are breaking up again, right OK it's come back, it just dropped for a few seconds.

To be honest I find keeping the artist is necessary but I've talked about it at great length in my thesis where I've said one of the things an artist within this type of framework, one of the things that happens to the artist is that, and it's pretty much the same as it's stated in relational aesthetics, that the role of the artist is no longer this idealistic idea of creation, that they are almost a craftsman and unique in what they do. In fact, it starts to incorporate this idea of almost curation, that they are not necessarily making things, but they are selecting things and presenting things in certain ways, but even that in itself is initiating something. So to keep calling it the artist is quite useful, it links back with the past, people understand what the artist is, but then you slightly redefine the artist's role as changing within this new context.

So the second question and this relates in particular to your field of education/theory and so forth — from an education perspective does the framework help to classify a practice in a way that is useful for you and/or useful for an audience? For example, do you think it provides insight into an artist's methodologies?

Francis: I haven't applied it so I can't give you a concrete answer to that but as a mechanism …

Garrett: I've lost you again.

Francis: Am I back?

Garrett: Yes you are back. Shall we maybe try closing the window and opening it again to see if that helps?

Francis: Right OK. Is that good?

Garrett: Yes it looks better.

Francis: I haven't used it so I can't give you a concrete example of whether this is useful or not as a specific case. But as a way of thinking about the phenomena of art in a way that uncouples it from traditional understandings of medium or object I can see its use as a mechanism for thinking differently in much the same way that as we were talking two weeks ago about actor-network theory not being a specific method but it was more of a sensibility. I can see how using those four things for describing an artistic situation, it could be a way of thinking something that you might take for granted, differently or anew. So I think that there is potential there. I haven't done it, so I don't know, but I think it probably is useful as a way of rethinking a situation which you might take for granted.

Garrett: OK great.

Francis: It was useful hearing you talk about the eBay piece actually. Just two further things in relation to that and they're not criticism, they're not problems, it's very close to this systems way of … can you still hear me?

Garrett: I can hear you yes.

Francis: OK great so I look at it, and I go yes that fits with a system way of art where you have an active observer, phenomena and then behaviour, so it doesn't come as a massive surprise to me. Then if you think about that, which I guess I've tried to in different places, if you think of that in relation to institutional theories of art, accounts of art, basically anything post-Duchamp it shares similarities with those as well.

Garrett: OK.

Francis: Again this is not a criticism …

Garrett: You are breaking up again. Hello.

OK, so you said this is not a criticism, and there was a sentence after that which I didn't quite catch.

Francis: It's a way of reframing or representing an account of art in the post-Duchamp condition that's being represented through different frameworks as well including the

institution and through systems paradigms of art and so on. So that makes sense?

Garrett: Yes it does. So connected to that question are there any scenarios, can you think of any artworks that you are aware of for example that should be classified within this framework as the type of art that I'm talking about but is excluded?

Francis: Oh.

Garrett: I'm keen to identify if there is anything that falls out of this scenario and would or should be identified as the networked art I'm talking about.

Francis: I don't think so because to think about artwork being as I said positioned within a constellation of the creator, the observer, the time of its instance and some sort of phenomenal aesthetic dimension to the work, as I said at the beginning I think that describes all artwork. One that needs some sort of origin, some sort of observer, that process of observation is temporal and requires engagement with some sensuous content.

Garrett: That's what I think basically that it goes back to what you said at the start that because the framework is abstract and is simplified in a sense that it incorporates an awful lot so it's that two-edged sword of yes I think it incorporates everything I can think of but the flip-side of that is then is it too vague.

Francis: Yes well that's the thing you need to work through. I find it convincing, as I said, of an account of an understanding of art in the post-Duchampian paradigm, whereby any certainty with regard to artist and medium are called into question, and therefore it requires a move from not what is art to when is art, which is behaviour because that is temporal. Then it also requires the observer and all context in order to activate that. That's the implication of the readymade, that's what as Thierry de Duve says the readymade shifts the question with regard to aesthetics from is this beautiful to is this art? The behaviour is not only is this art but when is this art? So because I come from a systems perspective, it matches with a systems perspective, I'm sympathetic towards it, and I prescribe to that idea. The problem with the systems perspective is yes as you pointed out it does lack specificity. Luhmann doesn't talk about artworks he talks about the medium of art; it's completely abstract to him. I think it's quite easy to respond to that and say actually that's because the condition of art right now is one that lacks specificity. If anything can be art, then we require a more abstract theory to be able to describe it. I think you could make the case that its very abstraction is a feature of its contemporaneity.

Garrett: Yes OK. So the next question I think I'm going to skip because I think we've covered it. It was, do you see any issues with the framework? I think we have already tackled where the issues might be, i.e. the simplification and the abstraction side, so I'll move onto the next one.

What's very important for me is that second purpose of my research which is explaining it to others, communicating, that's why I've spent quite a lot of time putting together this framework as this animated/interactive presentation. So the relationship between the text and the diagram is very important. It's explained in the thesis that the diagrams of the framework are not simple visualisations but in fact, the framework itself that effectively function as plans or maps and I'm referring to Deleuze and Guattari and their ideas about diagrams very specifically in the thesis. So it needs to communicate and function clearly. In your opinion are there any aspects of the diagram specifically that you did not understand? Any terms in there, any of the text comes up?

Francis: No I don't think so. I think on my screen when you moved away to the planes I had difficulty with some of that. I think some of that isn't quite as clear, which leads on to a related point, which is a sort of rhetorical question, why is this limited to being presented on a computer screen? Does that mean you have set a very particular limit on your presentation? It's a three-dimensional object for example so why are you limiting yourself to a very particular type of technology, that is the screen, and could it be because there isn't a better one?

Garrett: There are several reasons. I suppose my background is firstly working with programmed forms originally, so it's quite easy for me to sit down and do this kind of thing, it comes naturally. Just the means of explaining it in a manner where somebody can almost tangibly interact with it, and yet there be information there at the same time, a sculpture wouldn't quite do that, so this is a good way of presenting the information. But also restrictions of the PhD itself, trying to convince my supervisors to actually allow me to do this and submit it with the thesis was already difficult enough because they wanted the very traditional images in the thesis, which of course would rule out all the time aspects that this diagram captures. Anything beyond that would have been impossible to convince.

Francis: OK so is the diagram going to be the culmination of your practice-based research, or is that just an accompanying structure to help one understand what the research is?

Garrett: It's a bit of both, I've not specifically stated whether the diagram is just an aid to the thesis or whether it is practice in itself. I've very deliberately straddled between the two because I want it to be identified as yes this is practice, but it's also theorising about practice

and practice that is visualising theory. It's not the only practice I've done. I've done I think seven other works, which are not diagrams like this they are I suppose proper artworks and those are talked about in the thesis. I'm doing 50/50 practice/theory in my research.

Francis: Yes I know there are different models, and each one comes with its own challenges but what then is your thesis? What's your overall arching argument?

Garrett: My thesis is talking about the framework, it's talking about the history of the type of art that I'm proposing and then it's using my work and the work of some other artists as examples that I then talk through. So it has a little diegesis in it, but it's a full thesis. The thesis can be read on its own, and it will make sense because everything is there that you need.

Francis: And then what is the central argument of the thesis? What's the claim you are looking to defend?

Garrett: The unique contribution to knowledge is the framework itself that it provides a perspective on this type of art.

Francis: Gotcha OK. That's clear.

Garrett: So do you think an animated/interactive diagram helps in explaining the framework as opposed to just images in a thesis? Do you think this is a better way of …

Francis: That's an interesting question.

Garrett: It doesn't have to be the best way but I'm wondering is it better that the traditional images embedded into a thesis. There are perhaps even better ways of doing this; I'm just trying to …

Francis: I think it would be perfectly possible to describe your framework without an animation actually. That's what you have done talking to me. So actually to me of the two experiences where I sat for an hour this afternoon and worked with the animation and looked at some of your work and so on and then this conversation, this conversation has been much more enlightening. I think you don't need the animation in order to understand your thesis as you just said there, your thesis is the presentation of this methodological framework describing art as being positioned between these four coordinates. I don't know; no an animation doesn't add an additional layer of information for me.

Garrett: OK, no problem.

The last question was if you have any other points that you wish to raise or discuss, anything that you feel that I've missed.

Francis: No I don't think so. I'm sympathetic to the project. I think you give a very good account of it. The problems that it presents are very interesting ones, they are not problems that are going to go away, but the problems that it presents are ones that are similar to a systems approach which by virtue of its abstraction risks obscurity or potentially not saying anything, descriptively inert. I say that from a position of sympathy for this type of project. I like what you are thinking about and the way you have tried to set yourself a problem and tried to come up with your approach to it.

So to repeat there is an issue around specificity but that issue around specificity is in part what you are trying to respond to anyway. That's the problem but that problem I think you are taking head on because the problem you are dealing with is the condition of the type of art. I personally would push that a little further, consider this in relation to end of art arguments as well, which I'm also interested in. Art as a cultural form has become quite dissipated and distributed across other networks of commerce and communication.

Garrett: OK great thank you. I'm going to look at that book you held up, After Art. I think this is where I'm ending up anyway alongside the idea of this being post-disciplinary I'm going to make an argument at the end that this doesn't resolve all the issues, it's a perspective on the issues and how to work through them. Effectively what you are saying I see almost as a continuum of on one end you have medium specificity, and when you start getting rid of that you have ambiguity, you have an abstractness, and it becomes useless. It's about trying to find a balance between the two somewhere in the middle.